

ALISON  
BROOKS  
+ FELIX  
DE PASS



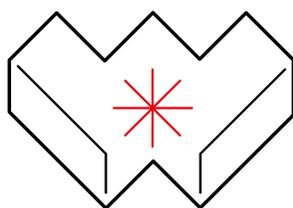
TERENCE  
CONRAN +  
SEBASTIAN  
COX



JOHN  
PAWSON  
+ STUDIO  
ARETI



ZAHA  
HADID +  
GARETH  
NEAL



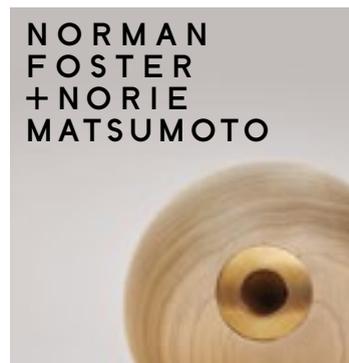
THE · W I S H · L I S T

10 LEADERS IN DESIGN COMMISSION 10  
EMERGING DESIGNERS TO CREATE THE  
OBJECT THEY HAVE ALWAYS WANTED.

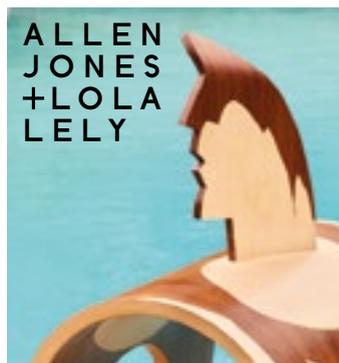
PAUL  
SMITH +  
NATHALIE  
DE LEVAL



NORMAN  
FOSTER  
+ NORIE  
MATSUMOTO



ALLEN  
JONES  
+ LOLA  
LELY



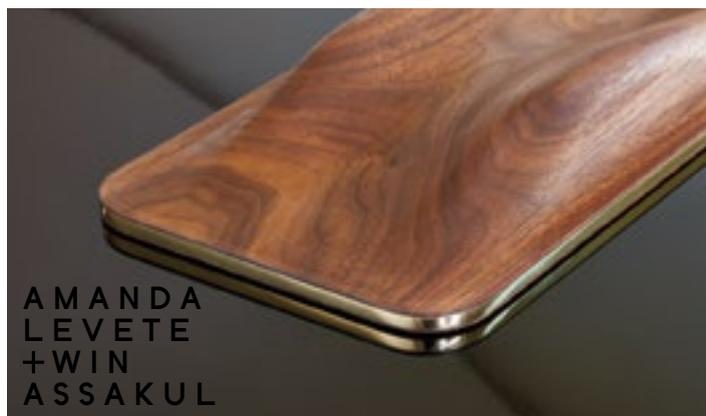
RICHARD  
& AB  
ROGERS  
+ XENIA  
MOSELEY



ALEX  
DE RIJKE  
+ BARNBY  
& DAY



AMANDA  
LEVETE  
+ WIN  
ASSAKUL





## \* FOREWORD

I am delighted to have played a part in bringing this project to life, both by approaching the experienced designers to act as 'commissioners' or mentors and by offering the workshops of Benchmark for a week of making.

I believe that The Wish List is not only exciting, but also of great importance to skilled manufacturing in wood. Design is integral to the success of industry and the up-and-coming designers get both inspiration from the professional they are working with, and actual experience in the workshop of how to make things. The teams have worked excellently and I am certain great friendships have been formed.

I have always believed that you can't design something unless you know how it is made. It is the inspiration of making that I think is important to designers as well as the quality of the materials that they use. They learn so much more here than at their design schools.

I have always thought that with the direction modern manufacturing has taken with robotics and CNC production, people involved in the process will be required less and less. In contrast to this trend, I have seen an opportunity for businesses like ours to produce things in smallish quantities and quite often bespoke projects, to help deal with the labour problems.

I think that this process could be far-reaching in its potential - it is something that governments around the world should be focusing on.



Image: Julian Broad

And as well as an extraordinary design project, The Wish List was an exploration of a really important and beautiful sustainable material - American hardwood. It has been a fascinating opportunity to learn specifically about the American hardwood resource and the great mix of species.

The project itself is now at an end, but I hope that it can represent a new beginning for skilled manufacturing in this country.

**Sir Terence Conran**

INTRO  
DUCTION



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# MAKING DREAMS COME TRUE

Emerging designers were teamed with more experienced 'commissioners' to design and make the objects that they had always wanted



**T**he Wish List is a unique project, a very special collaboration between some of the world's best-known design names and up-and-coming designers with the potential to perhaps become equally well known. It marries the excitement of design with the skill and challenge of making, broadening the designers' knowledge of working with wood and, in particular, of the range and properties of American hardwoods. It has also introduced the designers to the important concept of life-cycle environmental assessment (LCA), generating data that has added to the growing body of knowledge.

The project grew from a conversation between the American Hardwood Export Council (AHEC), furniture company Benchmark and Terence Conran. It follows on from a previous collaboration two years ago called *Out of the Woods*, when a group of students from the Royal College of Art designed and made chairs (in the broadest sense) at Benchmark, the company Conran co-founded in 1984 with Sean Sutcliffe at Kintbury in Berkshire. That project led to an exhibition at the Victoria & Albert Museum as part of the London Design Festival. Two years on, *The Wish List* did the same, but on a grander scale.

The concept is simple but daring.

Ten leading designers in their fields, many but not all architects, were asked to come up with their wish, the object that they had always wanted but never found or had time to design themselves. They paired up with younger designers, some that they had chosen themselves and others in a more or less arranged marriage. Together they worked on realising the design, in a back and forth discussion that was fruitful for both parties. This culminated in the chosen designers spending a week at the start of July at Benchmark. Camping in bell tents in what was effectively the end of Terence Conran's garden, they worked with the skilled craftsmen at Benchmark to realise their ideas (sometimes using techniques quite different to those they had imagined). Other specialists came for the week as well, such as a highly skilled turner. And several of the 'commissioners' (the experienced designers) went to Benchmark for at least a day, to participate in the making process and to make those last-minute key decisions that can only happen in the process of making.

The results were extraordinary. Mostly in one week (although some projects started earlier, and a few needed finishing off) the designers realised ambitious, original designs,



→ learning a great deal along the way about making in general and wood in particular, and delighting their commissioners. The benefits to all those involved are obvious, as is the appeal to everybody seeing the work. But there are two questions that will occur to the interested observer. The first is 'How?' How was it possible to bring such a stellar list of commissioners together, and for them to find time in their busy lives for this project? And the second is 'Why?' The effort put in by everybody was immense, and there has to be a good reason for that.

The answer to the 'how' is simply Terence Conran. A towering figure in the design

\\ It is hard to //  
imagine a  
better place  
than Benchmark  
for realising The  
Wish List

world, with extraordinary connections, he asked and they said yes. Even people such as Norman Foster, Paul Smith and Zaha Hadid would find it hard to say no to Terence Conran.

He put it more modestly. 'I'm not sure how instrumental I was,' he said. 'With the calibre and experience we were looking for, the names practically picked themselves, though I suppose it must help that I know them all personally. But it has really raised my spirits that this extraordinary cast of characters saw the value in our big idea and shared our passion for encouraging the next

generation of talent – it really does make a big difference.'

It is hard to imagine a better place than Benchmark for realising The Wish List project. Indeed, it is hard to think of anywhere else that it could have happened at all. A leading company of craftspeople and designers who produce well-designed furniture and bespoke commercial projects, Benchmark has a business acumen that is to be envied. While most of Britain's independent furniture makers have disappeared, Benchmark has prospered. And it has done this not by cutting margins and shaving quality, but by running an organisation that, while hard-nosed and hard-working, is near idyllic in its surroundings and its ethos.

Set in workshops in a number of former farm buildings near the Berkshire village of Kintbury, it uses traditional techniques where appropriate, and the latest technology where that is right. At the heart of Benchmark's work is timber, but it also has a specialist metal workshop and an upholstery studio. The highly skilled workforce, many of whom have come through the firm as apprentices, are not merely performing tasks but are solving problems and, when called upon, innovating.

The exciting and accomplished products that have been produced have not only enthused all those involved and taught them a great deal in a short length of time. They are also inspirational and showcase the timbers in new and imaginative ways. And, for everybody involved – the designers, the commissioners, the team at Benchmark and all the helpers who were drafted in, it was hard work but tremendous fun. As Sean Sutcliffe, managing director of Benchmark, said, 'You can't underestimate the importance of having fun'. ■

**Clockwise from top left:** Felix de Pass working on the stool for Alison Brooks; Richard Rogers, Ab Rogers and Xenia Moseley with The Ladder that Likes the Wall; Win Assakul with Amanda Levete; Sean Sutcliffe explains the camping arrangements; Terence Conran talks to Lewis Day (left) and Rob Barnby; Nathalie de Leval with Paul Smith; Sebastian Cox with the desk he designed for Terence Conran; Terence Conran and Sean Sutcliffe during the making week



# MEET THE DESIGNERS

1



1 XENIA MOSELEY

**Working with:**  
Richard and Ab Rogers  
**Wish:**  
Ladder



2 STUDIO ARETI

**Working with:**  
John Pawson  
**Wish:**  
Room fittings



2



3 WIN ASSAKUL

**Working with:**  
Amanda Levete  
**Wish:**  
Serving dish



3



4 GARETH NEAL

**Working with:**  
Zaha Hadid  
**Wish:**  
Tableware



4





5 NATHALIE DE LEVAL



**Working with:**

Paul Smith

**Wish:**

Garden shed

6 NORIE MATSUMOTO



**Working with:**

Norman Foster

**Wish:**

Pencil sharpeners

7 BARNBY & DAY



**Working with:**

Alex de Rijke

**Wish:**

Dining table



5

6

7

8

9

10

8 SEBASTIAN COX



**Working with:**

Terence Conran

**Wish:**

Workspace

9 LOLA LELY



**Working with:**

Allen Jones

**Wish:**

Chaise longue

10 FELIX DE PASS



**Working with:**

Alison Brooks

**Wish:**

Kitchen stools



# MEASURED SUSTAINABILITY

Scrutinising and measuring all environmental impacts was a vital part of The Wish List

**F**rom the beginning, and long before it was fashionable, Benchmark has embraced sustainability. 'I care about this because I am an old hippy,' said Sean Sutcliffe, managing director of the company. He was a much younger hippy when he set up the company with Terence Conran in 1984. 'I was lucky enough to be influenced by Jonathon Porritt [the ecologist who then chaired what is now the Green Party] at an early stage and he opened my eyes to a lot of issues about sustainable forest management,' he said.

This married with the aspirations of AHEC. While offering a challenging design experience with wood was at the heart of The Wish List, it wasn't the sole motivation for the project. David Venables, European director of AHEC, was eager to spread a better understanding and appreciation of the diverse virtues of American hardwoods and their environmental credentials. 'There is no better way I can think of to change opinions and communicate what we believe in,' he said.

AHEC believes that the underlying sustainability of using American hardwoods is still not fully understood, because people don't appreciate just how much of it there is, or how rapidly it replaces itself. Between 1953 and 2007, the volume of hardwood standing in American forests more than doubled and, according to the US Department of Agriculture's (USDA's) latest inventory, in 2012 was 11.46 billion m<sup>3</sup>. The area of hardwood and mixed hardwood/softwood forest in the US is about 120 million hectares, which represents 12% of US land area and is equivalent to the whole of England, France and Spain combined. These forests are still predominantly owned by small owners, and they regenerate naturally.

The principal management regime for

timber extraction is selective harvesting rather than clear felling, so large-scale cultivated replanting is unnecessary. In fact, the latest data from USDA Forest Inventory Analysis indicates that hardwood forest growth is 271 million m<sup>3</sup> per year while harvest is just 141 million m<sup>3</sup>. In other words, the volume of wood standing in US hardwood forests is increasing by 130 million m<sup>3</sup> per year after harvest. This annual increase in US hardwood stocks significantly exceeds the total volume of standing hardwood trees in the UK (100 million m<sup>3</sup>).

USDA projections for the 2010 Resource Planning Act Assessment indicate that even

\\ Innovative //  
 approaches  
 should break  
 the mindless  
 fashion cycle

in the very unlikely event of US hardwood harvests rising to four times the current level in the next 50 years, US hardwood forest volume in 2060 would still be around the level of today.

Over the last few decades, the issue of sustainability has been centred on certification and forest management, and European law now enforces due diligence on all imports of timber. But the wider debate has moved on to the environmental impact of all the materials we use and the processes that go into making products. Good intentions are great but for a long time there was nothing that could be measured.

In the last few years, AHEC has made a →

→ major commitment to life-cycle environmental assessment (LCA) and for Sean Sutcliffe this seemed like a natural extension of Benchmark's sustainability ethos. He said, 'When AHEC introduced LCA to me I thought it was a possible way of putting numbers to what we are doing.'

LCA is a means of measuring all the impacts of the production and use of materials, from production (growth in the case of trees) through treatment, transport, finishing, use and ultimately disposal. Impacts considered in LCA include carbon footprint (global warming potential), acidification, eutrophication, photochemical ozone creation

## \\ The designers // had to weigh and measure everything

and energy demand. LCA is an approach that is gaining increasing recognition but when AHEC carried out a major exercise on its timbers in 2011-12 it did so partly out of frustration that the timber industry, though inherently green, was lagging behind other industries in terms of the information it produced.

AHEC knew that its members were producing timber from a naturally renewing resource, and one moreover that acted as a carbon sink, but it needed hard figures that covered the entire process. It worked therefore with respected independent organisation PE International to produce audited information on all its timbers, from the forest to the factory gate. More recently,

it has added analyses for veneers to the original ones carried out on solid timbers.

Once the material reaches the factory (in this case the Benchmark workshop), measurements have to be made on the actual product being created. They have to take into account machine time and energy consumption, waste and how it is used (at Benchmark it is all recycled in some form or other), additional materials used and their impacts, transport from the factory and, finally, an informed estimate of the lifespan of the product.

In order to make this possible on The Wish List, the designers had not only to solve their technical dilemmas and rapidly acquire new skills. They also had to weigh and measure everything that they used, and record the time spent on every machine, so that this data could be fed through to PE International for analysis. Full results can be found on [www.wishlistdf.info](http://www.wishlistdf.info) and a detailed review is on pages 101-104.

For Sutcliffe this was a tremendously progressive step. 'I am sure that LCA, perhaps by another name, will be completely in the fabric of every aspect of life in the future, whether for furniture or food,' he said. 'Everybody will understand it. The backbone of the project for me was the LCA, in the learning and the education process for us and for the designers.' Some may have engaged with it more than others, but Sutcliffe believes that this will be at least as important a tool in their armoury as the design and making skills they have acquired.

And as for Benchmark? Sutcliffe is planning soon to provide LCAs for some of the products that he produces. Using American hardwoods, of course, because that is where the information is. ■



**Previous spread:** Sebastian Cox and helpers bringing back red oak from soaking in the river

**Top row, left to right:** Sebastian Cox entering LCA data; Felix de Pass shows his work to Terence Conran

**Middle row, left to right:** Benchmark crew working on the ladder with Xenia Moseley; working hard and having fun; the team that worked with Nathalie de Leval on Paul Smith's shed

**Bottom row, left to right:** Taking a break; the designers at Benchmark



# TIMBERS FROM AMERICA

The designers used all the most abundant US timbers, illustrating their diversity

The designers on The Wish List chose the timbers that best suited their requirements. While these did not represent the full range of American hardwoods available, they were a broad and interesting spread, crucially including the most abundant timbers. The following pages contain information on the timber species used in The Wish List. All of them are readily available in export markets.

It is a constant frustration for AHEC that while the proportion of timbers produced in the US remains relatively unchanging (see table on page 18), fashions mean that demand rises and falls. Producers cannot respond because the lifecycle of a tree is relatively long. This is not just a business issue for the producers but also one of sustainability. The most sustainable way to harvest forests is in the proportions in which they grow and in a consistent manner. Using the full mix of species is not only good business, and offers more choice to designers and architects - it is also the most sustainable way to manage forests, particularly if one wants to maximise →

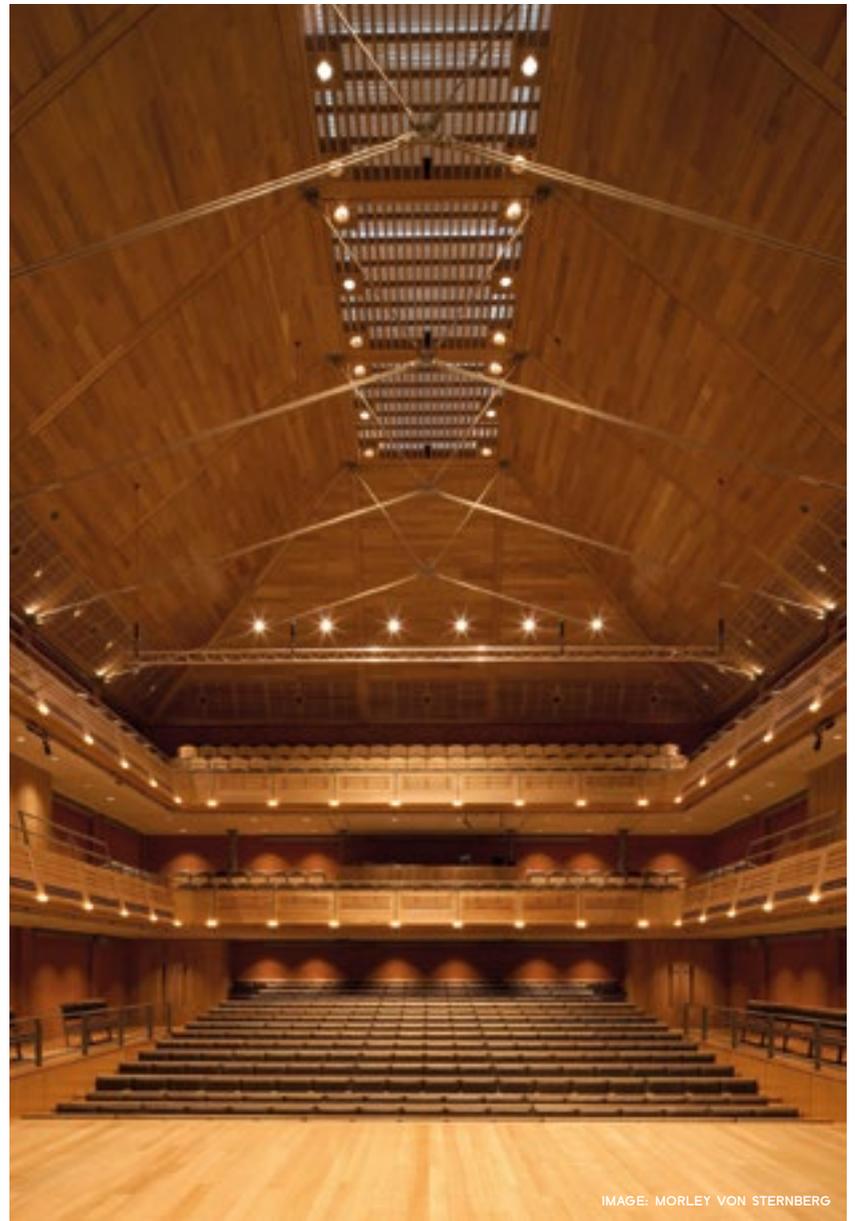


IMAGE: MORLEY VON STERNBERG

## ▲ AMERICAN WHITE OAK

APEX CENTRE, BURY ST EDMUNDS, UK  
BY HOPKINS ARCHITECTS

White oak is widespread throughout the US. There are about eight commercial sub-species, but they are of similar appearance and properties and traded together as white oak. White oak is popular in most export markets, especially Europe due to its similarity to European oak. It is a strong, hard, relatively heavy timber with good machining properties and is widely used for architectural interiors and furniture. It can also be used externally and structurally.

**WISH LIST PROJECTS:**  
VES-EL, ROOM



IMAGE: DENNIS GILBERT

TIMBER WAVE, LONDON DESIGN FESTIVAL 2011, UK  
BY ALA

## ◀ AMERICAN RED OAK

This classic-looking oak wood, with a distinct pale reddish tinge, has a uniquely warm appearance. It is strong and hardwearing and is the most used hardwood in the US and popular in Asia. European woodworking industries are less familiar with red oak and so reluctant to use it, but this is beginning to change as more designers are discovering its potential. The Timber Wave, designed by ALA with Arup and erected outside the Victoria & Albert Museum for the London Design Festival in 2011, was the first major structural use of the material in Europe.

**WISH LIST PROJECTS:**  
GETTING AWAY FROM IT ALL  
THE LADDER THAT LIKES THE WALL.

## ◀ AMERICAN CHERRY

American cherry makes up only 1% of the American forest resource, but the timber is readily available for use. It is a high-quality, fine-grained, rich reddish brown cabinet wood, which darkens with age and may contain streaks of lighter sapwood and dark gum flecks.

American cherry had a period of popularity in furniture making, but seems to have gone out of fashion. It has also been used for its acoustic properties and warm appearance in high-profile interiors projects such as the Casa di Musica in Rome, designed by Renzo Piano.

**WISH LIST PROJECTS:**  
GETTING AWAY FROM IT ALL  
A STOOL FOR THE KITCHEN



RIMINI CONVENTION CENTRE, ITALY BY GMP STUDIO



IMAGE:  
JONAS LENCER  
/ dRMM 2013

ENDLESS STAIR,  
LONDON DESIGN  
FESTIVAL 2013, UK  
BY dRMM

## ▶ AMERICAN MAPLE

The sapwood of maple is a creamy pale colour – a good neutral base and a great contrast with darker timbers. It is possible to specify this lighter sapwood – the heartwood is darker. The timber is relatively abundant and is hard and heavy, with good strength properties. It is excellent for steam bending. It machines well with care, and is reasonable for fixing, although pre-boring of holes is recommended. Its tight, smooth grain and hard-wearing properties make maple particularly popular for use in flooring in areas that will receive high levels of traffic.

**WISH LIST PROJECT:**  
THE HOLE CHAIR



CASTELLÓN'S AUDITORIUM AND CONGRESS HALL, SPAIN BY CARLOS FERRATER

## ▶ AMERICAN TULIPWOOD

Abundant and with excellent mechanical properties – and in particular a high strength-to-weight ratio – tulipwood is nevertheless a Cinderella in terms of the way that American hardwoods are used in Europe. The large size of the trees makes it possible to produce long and wide planks, but the wood tends to be specified for applications where it will be stained or painted. It has its own distinctive appearance, however, and its properties are finally beginning to gain some supporters.

**WISH LIST PROJECTS:**  
TULIPIFERA SHARPENERS  
TABLE TURNED

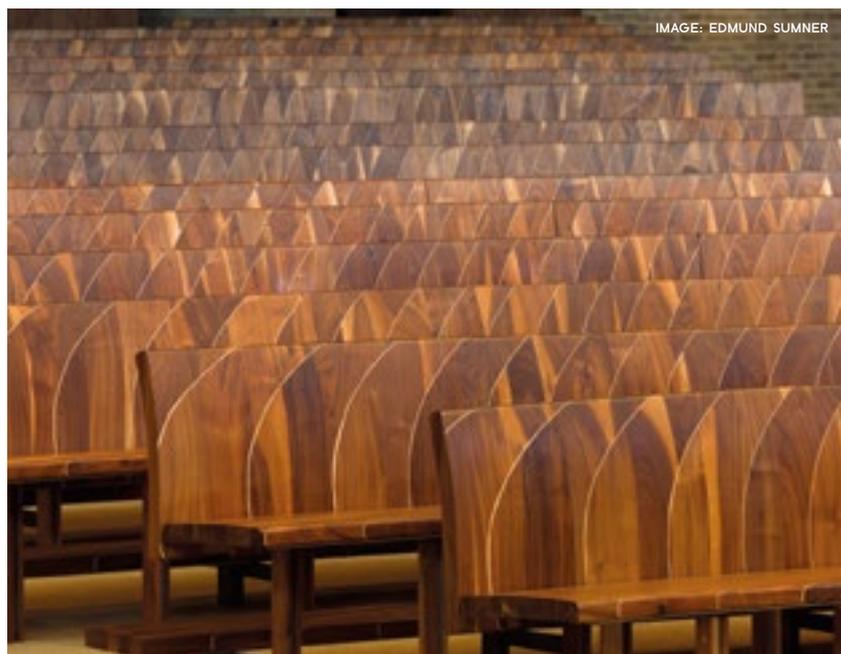


IMAGE: EDMUND SUMNER

## ▲ AMERICAN WALNUT

WORTH ABBEY, SUSSEX, UK  
BY HEATHERWICK STUDIO

This timber, with its beautiful dark heartwood, is perhaps the only one for which AHEC does not have to encourage greater use, since demand already outstrips supply. For this reason, it is one of the few American species that is actually planted as well as being allowed to regenerate naturally. There are times when only walnut will do. It is tough and hard, yet is relatively easy to

work and can achieve an exceptional polished finish. As well as looking stunning on its own, it contrasts beautifully with lighter timbers, so that a little may go a long way.

**WISH LIST PROJECTS:**  
6 X 500  
THE HOLE CHAIR  
ROOM



AÑANA SALT WORKS, SPAIN  
BY MIKEL LANDA

## ▲ AMERICAN ASH

American ash is a very versatile, light coloured hardwood, with strong and distinctive grain patterns. The sapwood is nearly white and the darker

heartwood varies according to growing region. Ash is strong and hardwearing and is used for a wide range of joinery and furniture applications.

→ their potential as carbon sinks. The UN Intergovernmental Panel on Climate Change wrote in its Fourth Assessment Report that, 'In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the largest sustained mitigation benefit.'

AHEC European director, David Venables was particularly pleased by the innovative approaches that some of the designers used. 'With at least four of the timbers,' he said, 'they are demonstrating a change in thinking.' The imaginative solutions, ranging from ash treatments that increase durability to new finishes for cherry and tulipwood, should challenge thinking and help to break the mindless fashion cycle.

**To learn more about the full range of commercially available American hardwoods, go to [www.americanhardwood.org/hardwood-species/](http://www.americanhardwood.org/hardwood-species/)** ■

## GROWING STOCK OF EASTERN AMERICAN HARDWOOD SPECIES

GROUP NAME	MILLION m <sup>3</sup>	% TOTAL
RED OAK	2168	18.9
WHITE OAK	1728	15.1
SOFT MAPLE	1255	11.0
TULIPWOOD	952	8.3
HARD MAPLE	819	7.1
OTHER	718	6.3
HICKORY	665	5.8
ASH	569	5.0
SWEETGUM	578	5.0
ASPEN	359	3.1
TUPELO AND BLACKGUM	350	3.1
CHERRY	306	2.7
BEECH	284	2.5
BASSWOOD	182	1.6
ELM	170	1.5
YELLOW BIRCH	173	1.5
BLACK WALNUT	93	0.8
COTTONWOOD	89	0.8
TOTAL	11457	100.0

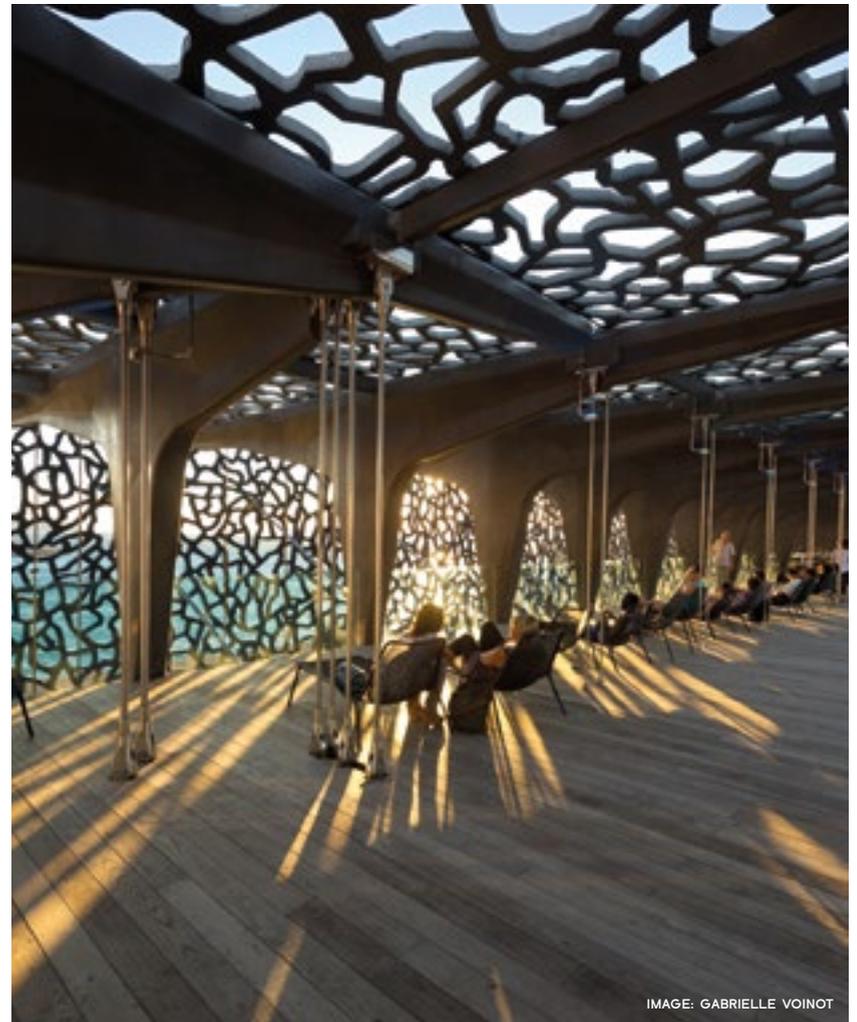


IMAGE: GABRIELLE VOINOT

## ▲ THERMALLY MODIFIED ASH

MUCEM, MARSEILLE, FRANCE  
BY RUDY RICCIOTTI

Thermally modified timber (TMT) uses a technique that was first developed in the 1990s to improve the performance and durability of softwoods, but it has more recently been extended to boost the performance of hardwoods, allowing certain timbers to be used outside with no additional protection. Thermal modification works with quite a few American hardwoods, including ash, hard and soft maple, tulipwood and red oak (with the best results from quarter-sawn timber), yellow birch and hickory. All these timbers, following thermal modification, can achieve Class 1 durability, highest possible rating.

The treatment process consists of heating the timber to a temperature of between 180 and 215°C for three to four days (the length of time depends on the thickness of the timber). This has to be done in an inert atmosphere (that is, one that contains no oxygen) to prevent the timber catching fire. This is normally done either in steam or in a vacuum.

The result is an irreversible change to the chemical and physical properties of the timber. This is very different to kiln drying, which only reduces the moisture content of the timber, so it can take up moisture again if wetted. With thermal modification, not only is the moisture content reduced to 4-6% (very low) but the equilibrium moisture content

also drops drastically. Put simply, the physical structure of the wood is changed so that potential moisture uptake is minimal.

There are two main benefits to thermal modification. One is that the timber has improved dimensional stability. The other is that the process destroys the hemicelluloses and carbohydrates that provide the main food sources for rot-producing fungi. The timber is therefore more resistant to rot, and does not need any surface treatment, painting or pressure treatment.

As a bonus, the timber has an attractive dark colour and, since this is the result of a chemical transformation, it runs right through the wood (although it will grey in time in the presence of ultraviolet light). For a timber such as ash, which was a popular choice for furniture several decades ago, this opens new possibilities in durable and attractive external applications.

Although the thermal modification process does use energy to heat the timber, this increased carbon footprint has to be set against the environmental impacts of the various protective treatments that are no longer needed.

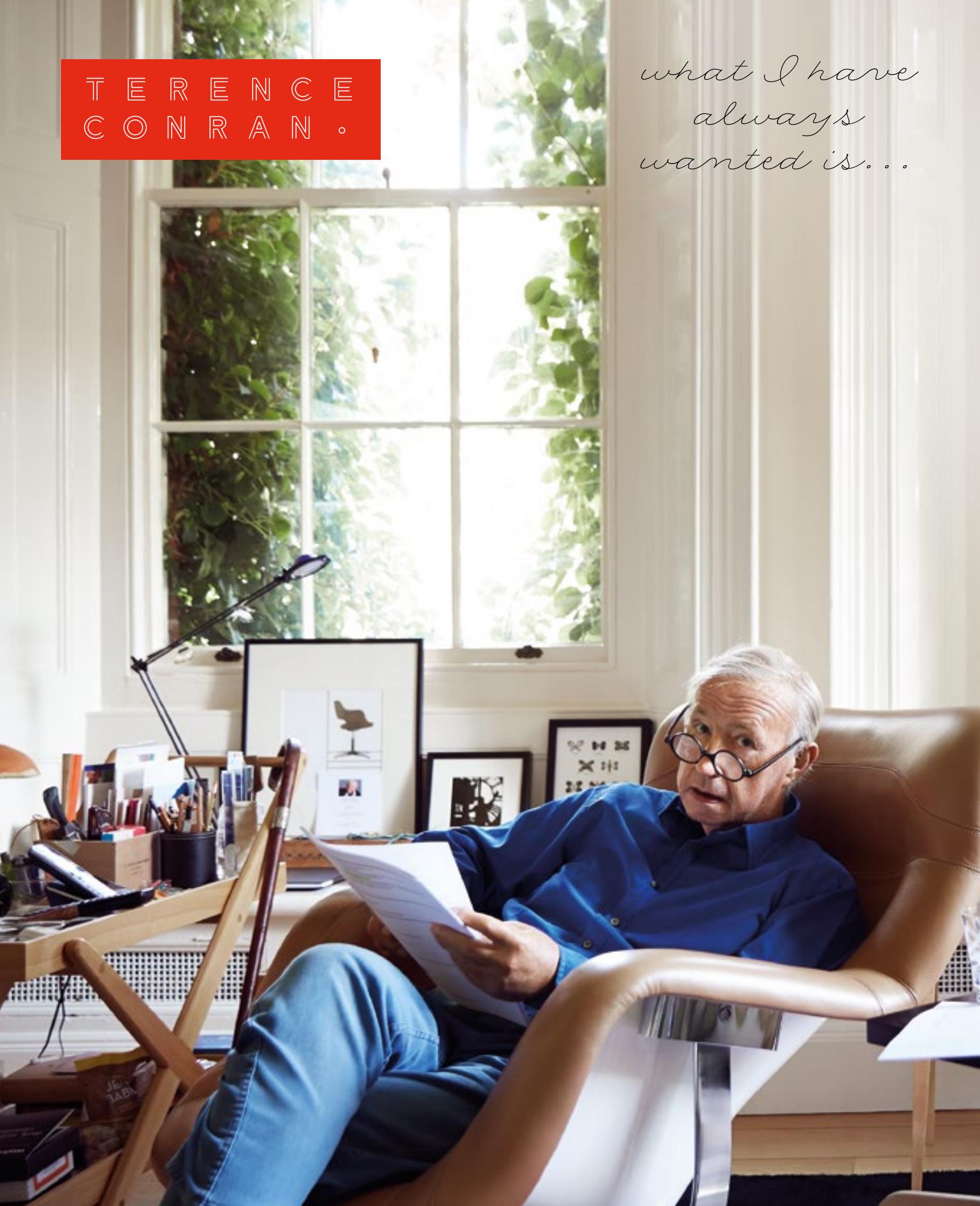
**WISH LIST PROJECT:**  
PAUL'S SHED

A top-down view of a workshop workbench. The workbench is a dark, worn metal surface covered in wood shavings. On the left, a green metal vise is mounted. In the center, two drill bits (one gold, one silver) lie on the surface. Below them, a small pile of wood shavings is visible. In the bottom right, a small white rectangular container is filled with nails, with more nails scattered around it. A circular saw blade is visible in the bottom left corner. The background shows wooden planks and a green wall.

# PROJECTS

TERENCE  
CONRAN.

*what I have  
always  
wanted is...*



# SPACE FOR UNDISTRACTED THOUGHT

'GETTING AWAY FROM IT ALL'

BY SEBASTIAN COX WITH TERENCE CONRAN  
MADE FROM AMERICAN CHERRY AND AMERICAN RED OAK

## The Commissioner

Sir Terence Conran is one of the giants of British design, revolutionising our attitudes to furniture and to food. He set up his own design business in 1956 and launched the first Habitat store in 1964. Later, he founded the Conran Shop as well as setting up Benchmark with Sean Sutcliffe. The Conran Roche architecture and planning consultancy, created in partnership with Fred Roche, was responsible for the conversion of the Michelin Garage into Bibendum and of the Bluebird Garage. In the 1980s, Conran bought Butler's Wharf on Shad Thames Street by Tower Bridge in London and redeveloped the area, putting several of his signature restaurants there and founding the Design Museum.

## The Wish

Terence Conran wanted a 'cocoon-like desk', a place where he could work without distractions, with everything that he needed to hand - not just a working surface, but also drawers and places for books. He said, 'I like the idea of being cocooned away, happily designing or writing in blissful peace - and it will save me going into the greenhouse in my garden, which is currently my favourite place for quiet time.' You might wonder why a man who has designed so much furniture didn't just get on and design what he wanted, but Conran said, 'While I have had the occasional piece customised, I have never once had the opportunity to design something purely and selfishly for myself.'



# THE DESIGNER

Sebastian Cox is a furniture designer and maker with a strong belief that sustainable design does not have to result in a boring or compromised product. He hand-makes simple and elegant pieces which have won awards and are recognised for their imaginative use of an underused resource

– coppiced hazel. Cox has designed furniture for Benchmark and for Heals. He is a superb craftsman, and all those with whom he worked during The Wish List were impressed by his mastery of technique as well as his dedication to his craft.





## THE DESIGN

A 'cocoon' desk with a carcass of American cherry and 'weaves' and facades in American red oak.

C O N  
R A N  
· + ·  
C O X



## THE DESIGN PROCESS

Terence Conran had a strong idea of what he wanted from the beginning, although he left Sebastian Cox to develop the detail – including a secret drawer whose location he has not revealed. ‘Terence was quite prescriptive with the design,’ Cox said. ‘He gave me dimensions. He wanted a rail with a curtain. I wasn’t keen as I wanted it to be all in wood.’ Instead, Cox came up with the idea of curved screens that could open or close. These are made with woven red oak, a material particularly suited to the process. Cox came up with a whitening finish to use on the red oak facades, to change the appearance. It wasn’t only the technical properties of the materials that appealed to Cox – he was also keen to use oak and cherry because they are not as fashionable as they could be and are under-exploited.



SPECIES  
USED

AMERICAN RED OAK

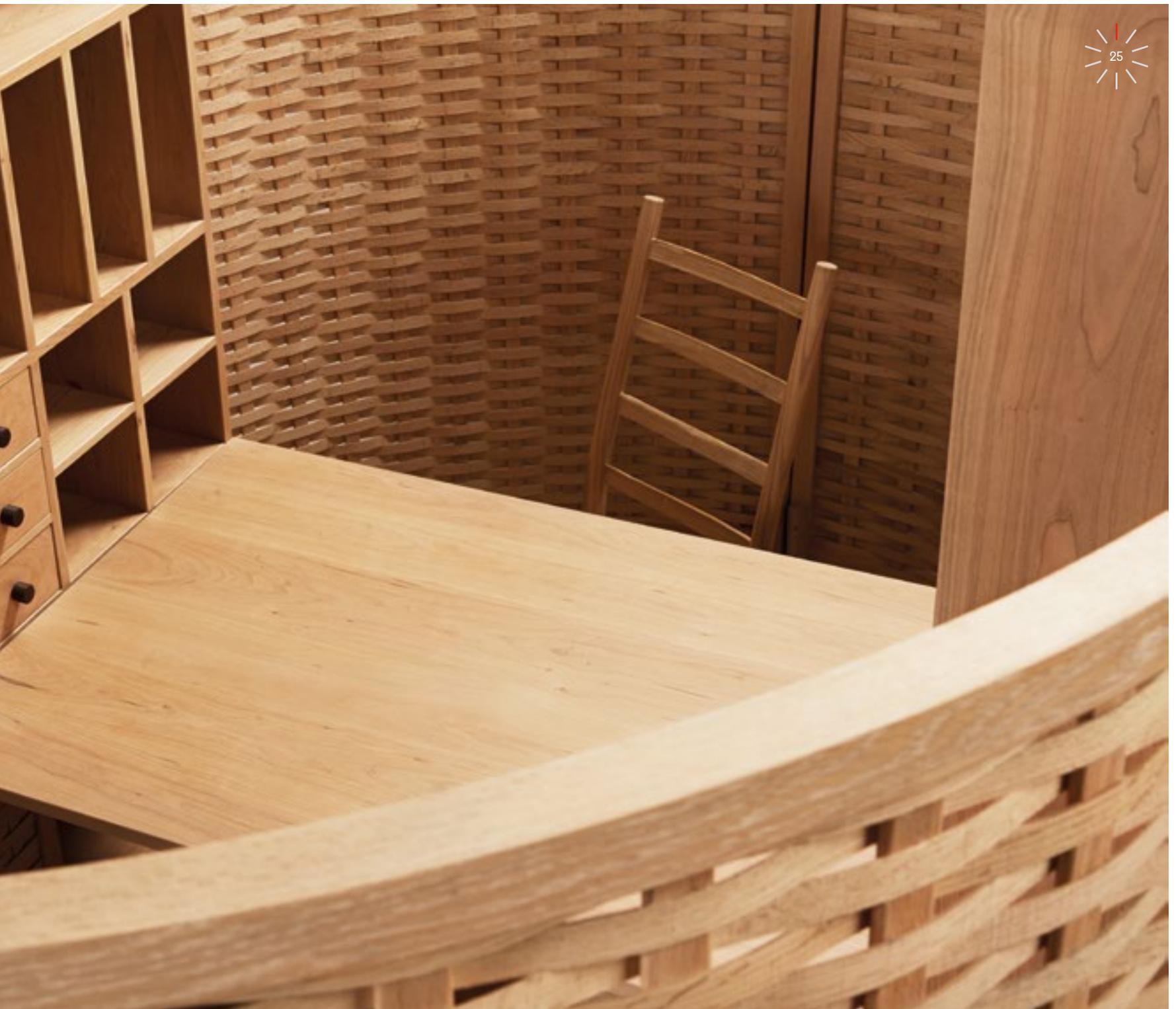
AMERICAN CHERRY



### CURVED OPENING SCREENS:

The screens can be open to welcome visitors, partially shut for more privacy, or entirely closed to signal ‘do not disturb’ and assist concentration





\\ This was the most intricate and //  
challenging thing that I had  
ever made, but how often will  
I get the chance to design for  
someone who is so important in  
the industry? **Sebastian Cox**



## THE MAKING PROCESS

There was an enormous amount of work involved in this project. In addition to the high level of skilled craftsmanship needed, there were a couple of special elements. One was the use of the woven red oak strips. Having carried out trials in his workshop by soaking a red oak board and seeing how pliable it became, for the actual project Cox soaked one-inch (25mm) thick oak boards in the brook on the Benchmark land, so that they became very supple. He then cut them into strips and, with an assistant, wove them.

The other special element was the tambour or roll-top to one of the cupboards. Normally these are made by sticking strips of timber to a cloth backing, but Cox made his from solid pieces of wood that were joined together mechanically. This should have a long life, but he still had to create a way of getting to the mechanism to replace it if necessary. This is hidden by a drawer. Terence Conran said, 'I have been making furniture for 60 years, but I am still learning from Sebastian.'





**Clockwise from top left:** Sebastian Cox at work; the project required an enormous amount of skilled work; putting the carcass together



## HOW IT HAPPENED



### SOAKING AND WEAVING THE RED OAK STRIPS



- ① Lowering the wood into the brook at Benchmark for soaking
- ② Cutting the wood into narrow strips
- ③ Weaving the screens

## LIFE-CYCLE ENVIRONMENTAL ASSESSMENT

The workspace is composed primarily of two American hardwoods – cherry and red oak – which are abundant and under-utilised. The US resource of both hardwoods is large and expanding. Use of these timbers, combined with strong craftsmanship skills – with their emphasis on efficient material and energy use – contribute to a strong environmental profile. The carbon footprint of the workspace is extraordinarily low for such a large and striking piece. Much of the energy input into material production derives from renewables. The waste wood produced during manufacturing and at end-of-life can be used for energy production, thereby offsetting use of fossil fuels. Of course, it would be a shame for such workmanship to be sent to the incinerator too soon. The

quality, beauty and durability of the design suggest the workspace will remain in use and act as a carbon store for many years. Such longevity also reduces the need for replacement, mitigating the significant environmental impacts of acidification and photochemical ozone creation potential (POCP) in material supply and manufacturing.

### CARBON FOOTPRINT IN CAR MILES:



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A L I S O N  
B R O O K S

*what I have  
always  
wanted is...*



# A PLACE TO PERCH IN THE KITCHEN

## 'A STOOL FOR THE KITCHEN'

BY FELIX DE PASS WITH ALISON BROOKS  
MADE FROM AMERICAN CHERRY

### The Commissioner

Alison Brooks is the principal and creative director of Alison Brooks Architects London, established in 1996. Her work has attracted international acclaim for its conceptual rigour and unique sculptural quality, founded on research into the specific cultural and environmental contexts of each project. Brooks is the only UK architect to have won the Stephen Lawrence Prize, the Manser Medal and the Stirling Prize. Alongside major residential, arts and masterplan projects, her largest public commission to date is a full academic and residential campus for Exeter College, Oxford. Brooks teaches and sits on juries including The Farrell Review of Architecture and the Built Environment.

### The Wish

Alison Brooks knew that she wanted an object that would not only be for her but could also go into production. She wanted a stool that could be used in the kitchen, because she likes the simple sociability and informality of sitting on a stool as opposed to a chair. Brooks felt that too many stools had a strong industrial aesthetic, whereas she was looking for something that was simpler and could work well in a range of environments. And she wanted it to be in American cherry, a timber that she felt was under-appreciated, and which her mother collected when she was growing up in Canada.



# THE DESIGNER

Felix de Pass is a British designer based in London. His studio focuses on the design and development of furniture, as well as product, lighting and interior design projects. Informed by a passion for materials and processes, Felix de Pass's studio is committed to delivering appropriate and functional solutions with a simple and direct design language. The studio engages in an exploration of cutting-edge technologies, rigorous research and a dynamic and creative design process that evolves in dialogue with the client and manufacturer. De Pass studied for an MA in design products at the Royal College of Art in London, graduating in 2009. Alison Brooks chose to be paired with de Pass, saying, 'Felix subtly combines ingenuity and poetic detail with pragmatism and clarity of purpose. This is an achievement in a world where too much design is trying too hard to be noticed.'





## THE DESIGN

A three-legged stool with a metal ring on which to rest your feet.

## THE DESIGN PROCESS

The design began with the idea of a stool that sat on a stem from which the legs splayed out to support it. Originally there were to be four legs, but these were soon refined down to three, triangular in section. De Pass designed the foot ring both for comfort – with a stool that is 650mm high, you need somewhere to rest your feet – and for structural stability. The legs want to splay outwards, and the

ring prevents them doing this. De Pass has always liked the idea of what he describes as a 'crown', and that is what the ring is – a circle of polished stainless steel joined by three bars, one to each of the legs. De Pass also designed a second, lower stool, 450mm high, for use at a table rather than kitchen worktops or island units. Because of its lower height, it did not need a foot ring.



SPECIES  
USED

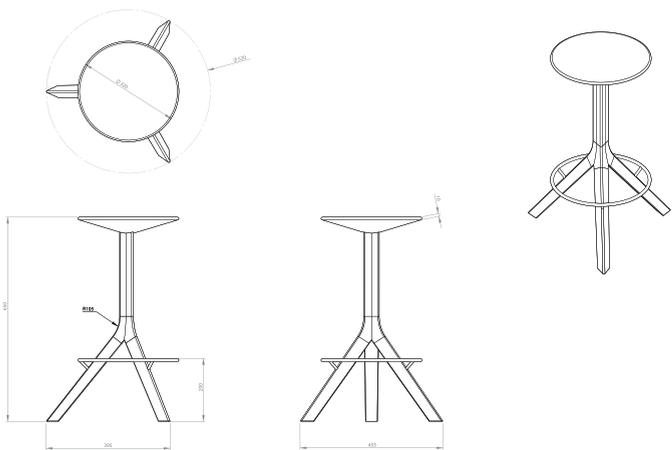
AMERICAN CHERRY

\\ I love working very //  
hard to tackle a  
problem in the  
right way, and then  
leaving it for other  
people to enjoy.  
**Felix de Pass**



**SKETCH 1:**

Early development drawings, showing how the shape evolved



**SKETCH 2:**

Developing the way that the three legs came together to form a single stem was crucial to the elegance of the design

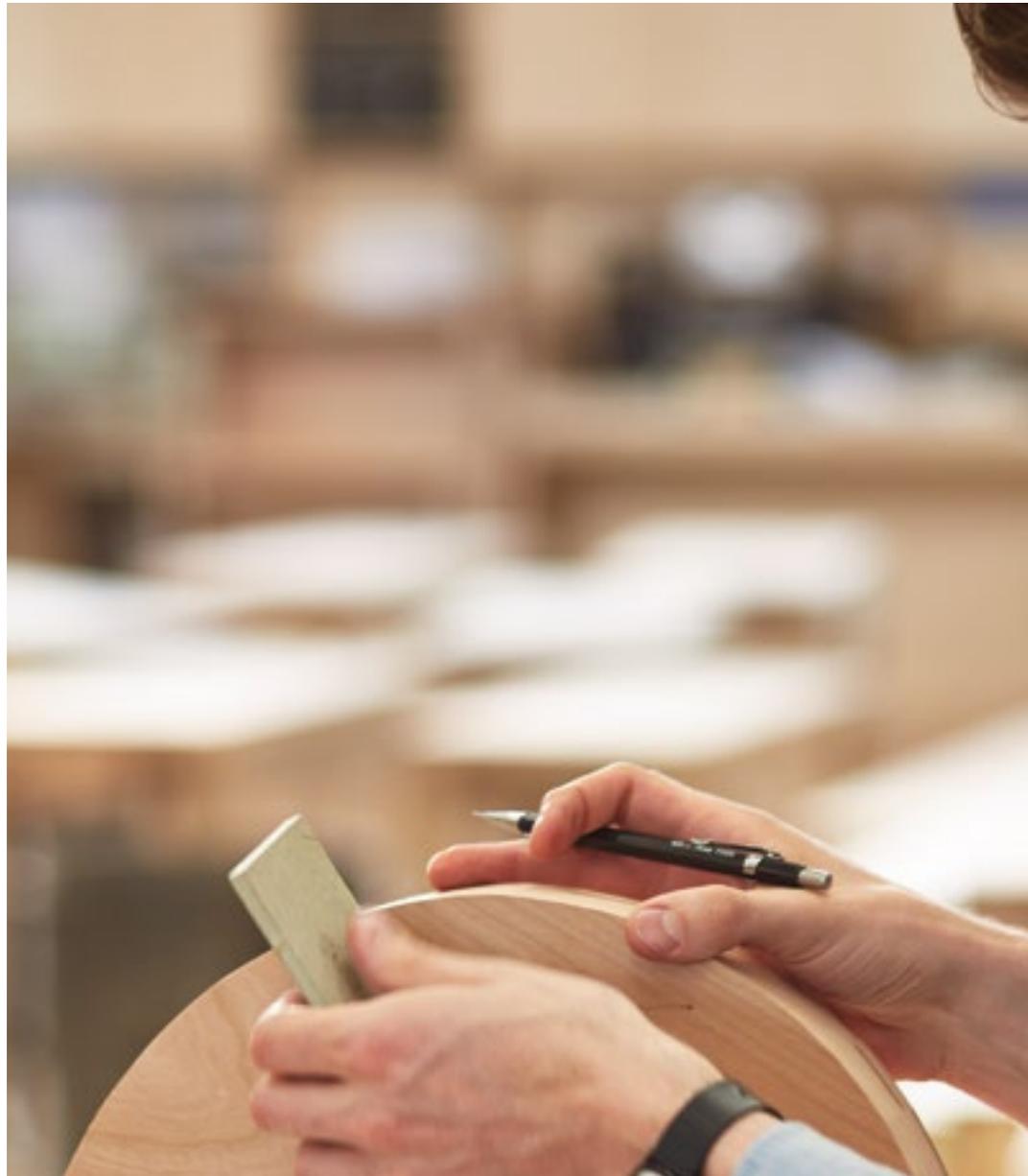


**THE FOOT RING:**

It took time to work out how to fit the metal foot ring, but it makes an attractive juxtaposition with the cherry stool

## THE MAKING PROCESS

Felix de Pass spent a great deal of the manufacturing period making jigs - which is just as it should be for an object intended for mass production. The effort goes into the preparation, rather than making the individual item. Jigs can be re-used and the actual making process is relatively inexpensive. This did not mean that it was without skill however. The cherry for the legs was steam bent, and the team at Benchmark worked out a way of attaching the foot ring to the legs, which seemed insoluble at first. When Alison Brooks visited Benchmark, she worked with Felix de Pass to refine the form of the seat. They made it disc-like - sturdy enough where it joins the base, but with a slender rim that makes it appear very light.





## LIFE-CYCLE ENVIRONMENTAL ASSESSMENT

American cherry is a positive environmental choice, being a highly desirable timber which is readily available in US forests but which has been under-used in recent years. US government forest inventory data shows that American cherry growing stock is 306 million m<sup>3</sup> - 2.7% of total US hardwood growing stock. American cherry is growing by 8.6 million m<sup>3</sup> while the annual harvest is 3.5 million m<sup>3</sup> per year. In other words, after harvesting, an additional 5.1 million m<sup>3</sup> of cherry accumulates in US forests every year, with growth exceeding harvest in all states. It takes just over a second for new growth in US forests to replace the cherry logs harvested to manufacture each stool.

The stool is carbon neutral on a cradle-to-grave basis. This is because very few non-wood materials are used and the carbon credits from disposing of wood are largely due to energy recovery that offsets the use of fossil fuels. An interesting consequence is that the more sustainably produced US hardwood you use, the lower the carbon footprint becomes.

### CARBON FOOTPRINT IN CAR MILES:



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**Clockwise from top:**  
Felix de Pass preparing the stool for the lathe; finishing the legs; checking for accuracy; steam bending the legs



N O R M A N  
F O S T E R

*what I have always  
wanted is...*



# A FAMILY OF PENCIL SHARPENERS

## 'TULIPIFERA SHARPENERS'

BY NORIE MATSUMOTO WITH NORMAN FOSTER  
MADE FROM AMERICAN TULIPWOOD

### The Commissioner

Norman Foster is the founder of Foster + Partners, the largest architecture practice in the UK and arguably the best known in the world. The practice is renowned for its rational, highly technically sophisticated buildings. Notable projects include 30 St Mary Axe - the 'Gherkin' - in London, the Hongkong and Shanghai Bank in Hong Kong and the new Spaceport America for Virgin Galactic in New Mexico. The practice describes itself as designing everything from the scale of a city to a pen. Lord Foster of Thames Bank, to give him his full title, has won many awards, including the Stirling Prize, the Pritzker Prize, the Minerva Medal, the Prince of Asturias Award and the AIA Gold Medal.

### The Wish

Foster + Partners may be one of the most advanced practices in the world in terms of its use of software, but its founder still likes to draw, 'For as long as I can remember the pencil and I have been inseparable companions - sketching and scribbling are integral to my way of life,' he said. He has a large collection of pencils of different types and described his wish as 'a pencil sharpener for three sizes capable of sitting on a desk and with a compartment to receive the shavings'. Norman Foster has more than one desk in his life, and so the wish expanded into a family of pencil sharpeners, each of which can live at a different location.



## THE DESIGNER

Norie Matsumoto is a Japanese product designer who is based in the UK. Her background is in furniture design and making and she developed her industrial design skills when studying at the Royal College of Art. While she was there, she was selected to take part in the Out of the Woods project, designing and making a hardwood chair at Benchmark. Hers was called 'Folded Chair' and was designed to spend most of its time resting against a wall. Matsumoto received a Conran Foundation Award in 2012, and set up her design studio in London in 2013.



# THE DESIGN

Geometric pencil sharpeners sitting on large trays for holding pencils.



F O S T E R  
+ M A T S U  
• M O T O •



## THE DESIGN PROCESS

Norie Matsumoto's first ideas for accommodating the three different sizes of sharpener involved creating a three-branched object a bit like a spigot. But she quickly evolved the much simpler forms - a cube, a cylinder and a sphere. Each of these contains the three sharpeners (or four in the case of the cube) facing in different directions. And each had a tray to sit on as well, large enough to hold a sizeable collection of pencils. The choice of timber was critical. Matsumoto took a range of samples to show Foster, and he immediately plumped for tulipwood. It is often seen as a low-quality timber but Foster loved the colour variation: 'Of all the samples that we examined, it was uniquely pale and the grain had an almost marble-like quality,' he said. He was also delighted to have chosen something that is abundant and inexpensive.



SPECIES  
USED

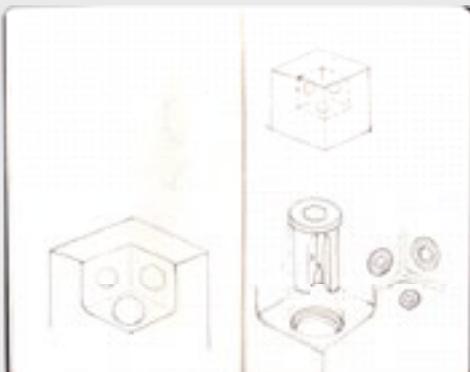
AMERICAN TULIPWOOD





IMAGE: NIGEL YOUNG/FOSTER + PARTNERS

\\ As always I enjoy interfacing //  
 with dedicated individuals who  
 are passionate about what they  
 do - being part of a motivated  
 team is what it is all about.  
**Norman Foster**



**SKETCHES:**  
 Norie Matsumoto  
 explored both  
 form and detail in  
 her sketch book



**MODELS:**  
 Early models in  
 foam and card  
 were essential  
 for exploring the  
 forms and their  
 relationship to the  
 trays on which they  
 would sit

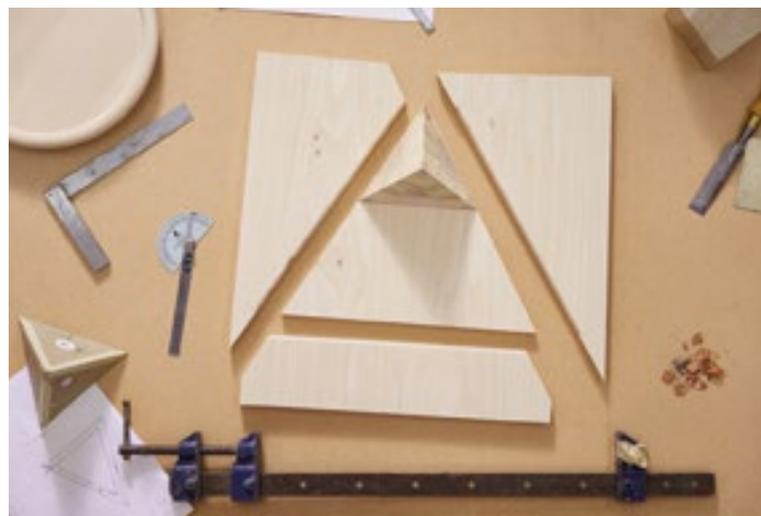
IMAGE: NIGEL YOUNG/FOSTER + PARTNERS



## THE MAKING PROCESS

Three of the four shapes were cut from solid pieces of tulipwood. The tetrahedron was the exception. This was larger than the thickest available stock (four inches – the US does not use metric measures) of tulipwood, so instead Matsumoto cut triangular pieces from the wood, and joined them together. ‘The angles and jointing

have been challenging,’ she said. A former RCA colleague, Michael Warren, helped to prepare the CAD drawings for the sharpeners, which have to fit pencils that are 8mm, 11mm and 12.5mm in diameter. The sharpeners were prepared by a bespoke brass-turning company and have been given a matte finish.



**Clockwise from opposite:** Norie Matsumoto making final adjustments to the spherical form; putting the tetrahedron together; consulting with independent furniture maker Liam Treanor; creating the tray for the tetrahedron; working on the cube



## LIFE-CYCLE ENVIRONMENTAL ASSESSMENT

The pencil sharpeners have a very strong environmental profile. Tulipwood is an abundant and under-used hardwood which also benefits from a relatively short drying time, resulting in lower emissions during the kilning process. It's very strong, durable and aesthetically attractive, reducing the need or desire for replacement. The set of four pencil sharpeners is very nearly carbon neutral. The use of wood ensures a big carbon offset due to the energy produced during waste incineration, which substitutes for fossil fuels. The sharpeners only fall short of carbon neutrality due to the relatively large amounts of electrical energy used during fabrication at Benchmark. Given that

this life-cycle environmental assessment (LCA) is a measure of the very first attempt to manufacture this product, if this design were ever commercialised it should be a relatively simple matter to increase production efficiency and ensure significant carbon benefits.

### CARBON FOOTPRINT IN CAR MILES:



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Z A H A •  
H A D I D

*what I have  
always wanted  
is...*



# A NEW APPROACH TO TABLEWARE

## 'VES-EL'

BY GARETH NEAL WITH ZAHA HADID  
MADE FROM AMERICAN WHITE OAK

### The Commissioner

The Iraqi-born architect Zaha Hadid, based in London, is internationally renowned, having undertaken nearly 1,000 projects of all kinds in myriad countries. She was awarded the Pritzker Prize in 2004 and the Stirling Prize in 2010 and 2011. Her Aquatics Centre, designed for the 2012 Olympic Games in London, has been shortlisted for this year's Stirling Prize. Her projects are characterised by their geometric complexity and often by curved forms. In addition to buildings, she has designed furniture and shoes. In 2012, Zaha Hadid was appointed Dame Commander of the British Empire (DBE) for services to architecture.

### The Wish

Hadid's wish was very open-ended, simply specifying 'tableware'. It was evident from her own work that Hadid would not be looking for something that was ordinary or utilitarian and her team were excited by the potential of 'applying contemporary techniques to a very traditional material'. The designer, Gareth Neal, said, 'She's given me lots of freedom to respond to the brief, which has been great.' Upon receiving the brief, he chose to play with the form of a carafe or water carrier and turn it into something sculptural. Can you like what you get, when you didn't specify what you wanted? In Hadid's case yes. 'It's very beautiful,' she said.



# THE DESIGNER

Gareth Neal approaches design through material inventiveness, curiosity and reinterpretation. His work engages with his own personal research into traditional processes and digital manufacture, with designs that intuitively engage with the tacit qualities embedded within the materials, processes and function.

Projects range from individual pieces for the international collectors' market to bespoke commissions for private clients and the design of production pieces for industry. In 2013 the Victoria and Albert Museum in London purchased Gareth Neal's 'George' chest of drawers for its permanent collection.





## THE DESIGN

Vessel shapes that have been extruded along an axis, and have an opening at one end.



## THE DESIGN PROCESS

Gareth Neal approached the project by thinking about the fluid dynamic of Zaha Hadid's designs. The water carafe idea emerged from considering the liquid nature of her work, but juxtaposing that with a functional element. At first, he said, 'I was thinking of something very functional. Then I thought, let's push the boundaries.' He was invited to go to Hadid's office and work with her design team, using the company's modelling software to create the vessel. From this came the idea of extruding the form along one of its axes with a slit opening at the end that allowed the viewer to look into what Neal described as 'a cathedral-like space'. He was interested in the idiosyncrasies of traditional hand processes such as a hand-thrown pot or a raised piece of silverware, and how simulating these could be achieved through digital imitation.



SPECIES  
USED

AMERICAN WHITE OAK



\\ I definitely feel //  
it has been a  
50-50 process.  
**Gareth Neal**



#### SURFACE FINISH:

Although it is obvious that the vessels have been made by machine, there is an evident analogy with hand-thrown pots. On the unpainted vessel there are also strong colour changes, which Gareth Neal and Zaha Hadid decided they wanted to keep and celebrate.



## THE MAKING PROCESS

Gareth Neal decided to attempt two of the simpler forms that he had envisaged - a good idea since even making these was challenging. Benchmark had to upgrade its software, and Sean Sutcliffe said, 'I have been running my workshop for 32 years, and this is the most remarkable thing we have ever made.' Neal and Benchmark craftsman, Colin White spent ages watching and then checking the CNC machine. 'It is just another hand tool,' Neal said. 'I have realised how strong a human-like property it has. Its quirks are like human nature.' Part of this, he believes, is because it has been programmed by people, and therefore is prone to error. The vessels were made in two halves which were expected to be identical but in fact were not quite, adding the sense of a 'maker's mark'. Neal intended to ebonise the exterior of both vessels, but having shown the first one to Hadid, they agreed to keep one natural.

**Clockwise from above:**

Gareth Neal watching the CNC machine; interior after CNC cutting; finishing touches; a finished half; the CNC machine at work





## LIFE-CYCLE ENVIRONMENTAL ASSESSMENT

A large proportion of the wood required to manufacture the vessels did not end up in the finished product. This reduces the long-term carbon storage potential but it also means that there is a significant volume of waste wood diverted to energy production. The overall mass of wood waste arising during manufacture is much greater than the final mass of the product. As a result, the credits from processing are greater than those from end-of-life. A significant proportion of the vessels' carbon footprint is due to the use of grid energy to power the CNC machine at Benchmark. This exceeds the total carbon emissions resulting from extracting, processing and transporting the US hardwood to the UK.

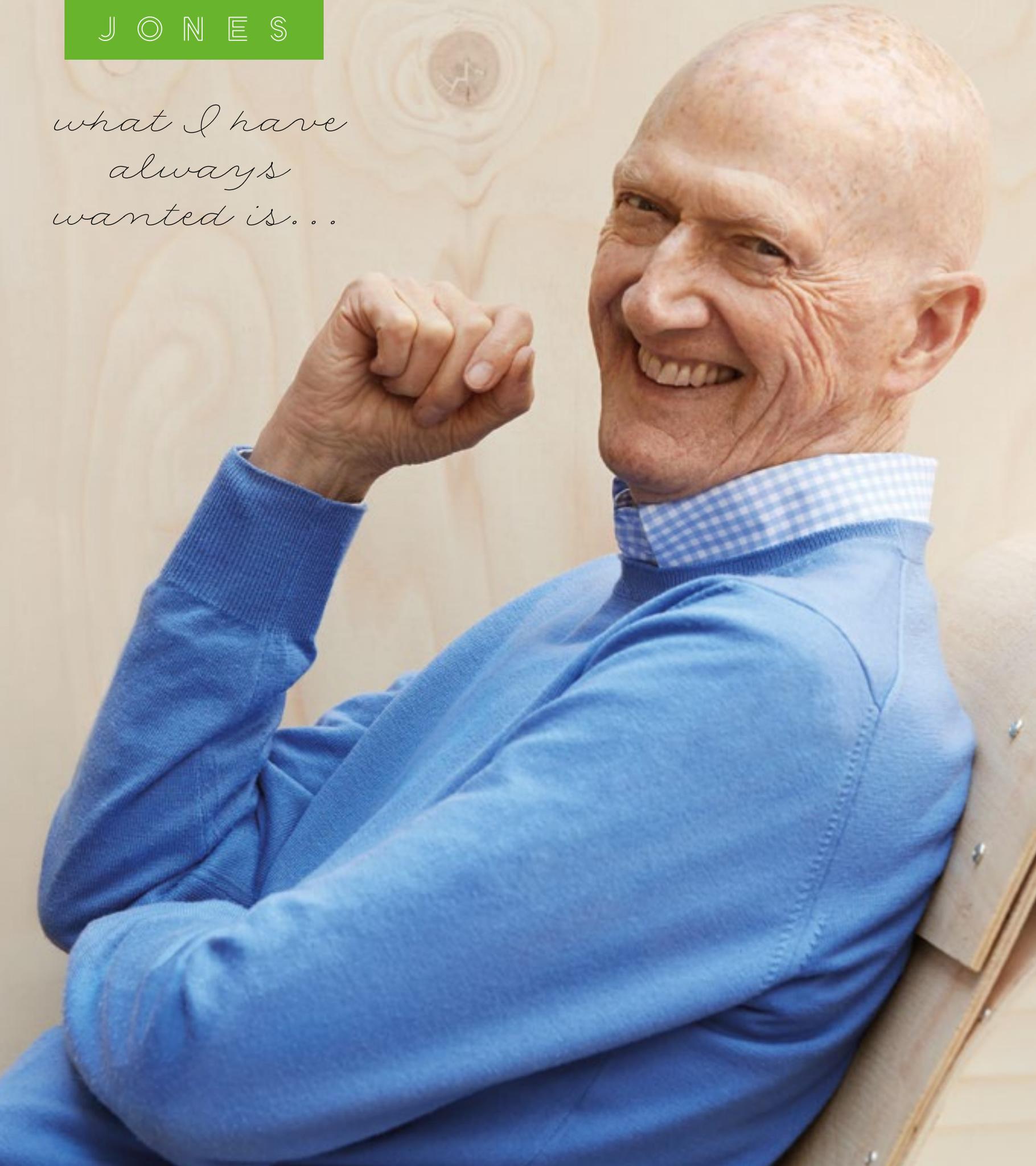
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A L L E N  
J O N E S

*what I have  
always  
wanted is...*



# A SEAT IN HUMAN FORM

## 'THE HOLE CHAIR'

BY LOLA LELY WITH ALLEN JONES  
MADE FROM AMERICAN MAPLE AND AMERICAN WALNUT

### The Commissioner

Allen Jones is a painter, sculptor and printmaker who studied at the Royal College of Art and is associated with the genesis of Pop Art. He is best known for 'Chair', one of a series of transgressive sculptures that he created in 1969, in which the seat is supported by a female mannequin dressed in black boots and underwear. The profile of his later output may be lower, but he has continued to work steadily in both sculpture and lithography, drawing much of his imagery from advertising and performance. Jones is a Royal Academician and will be the subject of a retrospective at the Royal Academy in London from 13 November 2014 to 25 January 2015.

### The Wish

Jones' wish was for a recliner in the shape of the human form. It was a concept that he developed more than 10 years ago but, he said, 'I didn't have the facilities to pursue it.' The idea was that it should have a personalised form, fitted exactly to the contours of Jones' body, and also a deliberate androgyny. A dowel, inserted into the drainage hole for the recliner, will make it unmistakably male (it takes its inspiration from the removable phallus on Marino Marini's statue of a horseman in front of the Peggy Guggenheim Collection in Venice). But when Jones removes the dowel he will, he says, 'be coupling with a female form'.



## THE DESIGNER

Lola Lely is a designer living and working in east London. Her work is process and narrative-based, which means that often, if there is an outcome, it is in the form of an event rather than just a product, a resting point rather than an end point. She has collaborated with a diverse range of experts including an anthropologist, a weaver, a storyteller and a silversmith on a variety of different projects. On The Wish List project, she said, 'My role was as an enabler. This time I was the problem-solver. It is all right not to be so much of a designer on this project. This is what Allen has always wanted and it is what he is going to get.'



# THE DESIGN

A recliner with a head and a removable dowel.





## THE DESIGN PROCESS

The fact that the idea was set so firmly in Allen Jones' head meant that design development was much more to do with making it work than coming up with new ideas. The chair evolved from a recliner into a more upright form. Lola Lely made a full-size model for Jones to try out and to which she then made adjustments for comfort. This was brought by truck from Benchmark and Jones ended up being 'fitted' in the truck outside his home in London's Barbican, to the entertainment of passers-by.

'The only way we could make the shape I wanted was in veneer,' said Lely.

The main timber used is maple, which is of a uniform pale colour, and contrasts well with the 'drawing' in the dark tones of walnut. Ace Marquetry created this with great precision from Allen Jones' drawings (there is an image on the underside as well). 'I digitised Allen's sketch,' said Lely, 'and sent it to them for laser cutting.' The result is a quirky, appealing and very personal creation - from the mind of Allen Jones, to fit the body of Allen Jones, but with subtle and vital input from Lola Lely.



### SKETCH:

Allen Jones' original maquette and sketch, made more than 10 years' ago





SPECIES  
USED

AMERICAN MAPLE

AMERICAN WALNUT



## HOW IT HAPPENED



### THE TRUCK FITTING



- ① Man in van: Allen Jones meets Lola Lely for his fitting
- ② The plywood form is adjusted to fit
- ③ Jones tests out his made-to-measure recliner

## THE MAKING PROCESS

Lola Lely's main task during the making week at Benchmark was to build up the chair on its form from the 13 layers of maple veneer, plus the special top and bottom layers in marquetry. 'They went together like jigsaws,' she said.

Allen Jones spent a day in the workshop with her and it was at that point that he decided that the solid head, always present in his original design, was not working. Later, he and Lely returned to the problem. 'We went back to Benchmark on a weekend, with fresh eyes and without the stress of the making week, and spent a few hours drawing up new heads, tearing away, pinching and manipulating various paper heads,' she said. 'The head still looks a bit odd, but in a good way. Allen is really pleased with the results.'





\\ It was a great // experience, as I had never veneered before. And I have also learnt a lot from watching other people. **Lola Lely**



## LIFE-CYCLE ENVIRONMENTAL ASSESSMENT

The large mass of MDF required for the mould makes a significant contribution across all environmental impact categories. As this is a one-off, the full impact of the MDF mould is allocated to the recliner. However, if the recliner were produced commercially, the MDF moulds would be re-used and this impact would be allocated among multiple products. There is very little manufacturing waste associated with this product. The credits received from disposal at end-of-life are therefore greater than those received from disposal of manufacturing waste. While it's reassuring that the environmental burden can be offset by burning the

product at end-of-life, as a durable and timeless piece of furniture, the recliner should last a lifetime. This minimises the impacts associated with replacement and means that the carbon stored in the product supplements the accumulating carbon store in the US forest.

### CARBON FOOTPRINT IN CAR MILES:



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**Clockwise from top left:** Vacuum-setting the glue between the layers of veneer; Allen Jones and Lola Lely working together at Benchmark; applying the top layer of veneer; Lely finishing the surface; sanding the edges of the recliner

A M A N D A  
L E V E T E

*what I have always  
wanted is...*



# A LONG SERVING DISH

'6 X 500'

BY WIN ASSAKUL WITH AMANDA LEVETE  
MADE FROM AMERICAN WALNUT

## The Commissioner

Amanda Levetete is the founder of ALA, an international award-winning design and architecture studio set up in 2009. Recent commissions include the highly anticipated expansion of the Victoria and Albert Museum in London, a 1.5 million ft<sup>2</sup> luxury shopping mall and hotel in Bangkok on the former grounds of the British Embassy, a new centre for the cancer care charity Maggie's, a 13-hectare media campus for Sky and a cultural centre in Lisbon commissioned by energy company Energias De Portugal. In 2011 Amanda Levetete designed the Timber Wave, a large and complex structure in American red oak that stood outside the Victoria and Albert Museum during the London Design Festival.

## The Wish

'I thought hard about what I really wanted,' Amanda Levetete said. She often entertains up to 18 people at the 4.8m-long dining table that she designed herself. She loved the idea of having a long serving dish that would allow people to help themselves directly to cheese, cold meats or fruit. For this, the dish ideally had to be reversible. It also needed to be modular so it could shrink for smaller parties, and she wanted a way of storing the elements so that you could still see what they were. Aesthetically, Levetete was influenced by a tradition of very beautiful, shallow African bowls, often embellished with rich materials or engraved. The storage box, she said, should be as beautiful as the dish itself.



# THE DESIGNER

Win Assakul has just completed his part II in architecture at the Architectural Association. Born in Thailand, he was educated in the UK and spent his year out at ALA. 'He was probably the best year-out student we have ever had,' Amanda Leveté said. 'He is quite exceptional as a designer, thinker and communicator. It is rare to find those qualities in one so young.' Assakul is interested in the idea that product design can act as a catalyst or testbed for architectural ideas. Prior to this project, he had no experience of physically making objects. Working on The Wish List coincided with his final exams. His solution? To 'give 100%' to both.





## THE DESIGN

A contoured, reversible walnut dish  
in six pieces with brass edging.



## THE DESIGN PROCESS

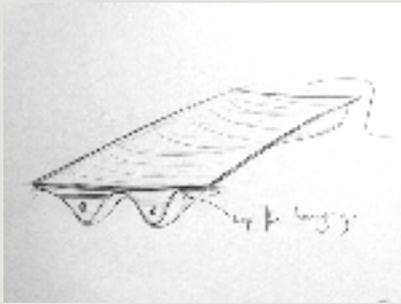
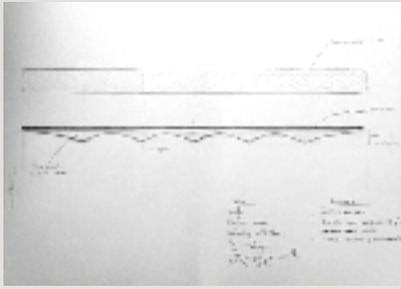
The dish took its form fairly quickly, with sketches from Assakul. It was to be in six pieces: four interchangeable central sections, and two ends. Both Assakul and Leveté loved the look and feel of walnut. The idea was that it would be nearly flat on one side, for the cold meat and cheeses, and with deeper hollows on the other, to hold fruit. The early sketches are close to

the final geometry, although ideas such as having a lip for hanging were superseded by stacking in a box. The edge is trimmed in brass, which both protects it and adds a little extra excitement. Assakul was told on his first visit to Benchmark that there would be an insoluble problem with differential movement of the brass and timber, but he found a solution!



\\ It is a beautiful idea to //  
be asked to be a mentor  
to somebody I respect and  
who is just starting out.

**Amanda Leveté**



SKETCHES:

Win Assakul's early drawings



SPECIES  
USED

AMERICAN WALNUT

## THE MAKING PROCESS

This was a tremendous learning process for Win Assakul, and one in which he triumphed. The shape was complex - 'We had designed it with as little flat surface as possible on the underside, to reveal as much of the grain as we could', he said. He took a number of sections from the computer drawings of the dish, and used those as templates. But in fact, every piece is subtly different because of the hand-carving. Assakul used dovetail joints to join the pieces after considering more sophisticated but less elegant solutions. Creating these was a delicate balancing act - they had to be tight enough to fit, but not so tight that a mallet would be needed to separate them. He created grooves around the edges of the pieces, and the brass simply slots into those.





**Clockwise from above:**  
Starting work on the box; the finishing process; creating the profile by hand; Win Assakul learnt a lot of craft skills



## LIFE-CYCLE ENVIRONMENTAL ASSESSMENT

Efficient use of material means there is relatively little manufacturing waste and a large share of the carbon in the wood supplied to Benchmark ends up stored in the dish. The credits received for energy production from wood waste during manufacturing are about equivalent to those received from final disposal at end-of-life. The total eutrophication potential of the dish is 0.03kg of phosphate equivalent, about the same as caused each year by conventional farming of 14m<sup>2</sup> of land for wheat in the UK. Nearly all of the eutrophication potential of the vessels is due to nitrate emissions during the burning of fuels for transport and processing of materials. Hardly any eutrophication potential is linked to growth of US hardwoods, which thrive under natural conditions and very rarely require fertilisers. The serving dish's acidification potential is 0.26kg of sulphur dioxide equivalent, mainly due to emissions during shipping of hardwoods from the US to the UK. The other significant contributor to acidification potential is the use of grid electricity both at Benchmark in the UK and during processing of the hardwood in the US, mainly to power the fans in the kilns.

## CARBON FOOTPRINT IN CAR MILES:



Car Miles represents the cradle-to-grave carbon footprint of the product expressed as the distance travelled by an average UK car that produces equivalent carbon emissions. It assumes average carbon emissions of 224g/mile for all the UK's major new cars, calculated by Carpages at [www.carpages.co.uk/co2/](http://www.carpages.co.uk/co2/)



## CNC IS NOT ALWAYS THE BEST WAY

Through his architectural work, Assakul is used to creating complex shapes by computer that are then sent for manufacture. 'All that I knew was CNC,' he said, fully expecting that this was the only way to make his bowl. But Sean Sutcliffe explained that it would be a very lengthy and expensive process, and would result in a far more mechanical-looking surface than the hand-making that he persuaded Assakul to undertake - with excellent results.

J O H N •  
P A W S O N

*what I have  
always  
wanted  
is...*



# TO MAKE THE EVERYDAY MORE BEAUTIFUL

## 'ROOM'

BY STUDIO ARETI WITH JOHN PAWSON  
MADE FROM AMERICAN WHITE OAK AND AMERICAN WALNUT

### The Commissioner

John Pawson was born in 1949 in Halifax, Yorkshire. After a period in the family textile business, he lived for a number of years in Japan, where he met the architect and designer Shiro Kuramata. Following his return to England, he enrolled at the Architecture Association in London, leaving to establish his own practice in 1981.

Pawson's work spans a wide range of scales and typologies, from a bridge across a lake and a flagship store for Calvin Klein, to ballet sets, bridges, yacht interiors, a new Cistercian monastery in Bohemia and houses in Europe, the US and Asia. He is currently working on the remodelling of the former Commonwealth Institute in London, scheduled to open as a new permanent home for the Design Museum in 2016.

### The Wish

What do you give somebody who wants nothing? John Pawson decided that what he needed was a family of elements that could work in the house in the country that he is currently remodelling for his family. The site included 17th, 18th, 19th and 20th-century domestic and agricultural buildings. 'Rather than starting with the idea of commissioning a specific piece of furniture, I was interested in getting Studio Areti to explore the things you touch and use every day, that are moments in the life of a place as well as objects - switching on a light, opening a door, hanging a shirt on a hook, taking a book down from a shelf,' he said. 'Some of these are very small physical elements in themselves, but they come together to make the atmosphere of a space.'





## THE DESIGNERS

Sisters Guillane (left) and Gwendolyn Kerschbaumer set up Atelier Areti in 2008 to focus on lighting, furniture and other designs related to interior architecture. Gwendolyn has a BA in visual arts from Duke University and an MA in architecture from Harvard. Before setting up Atelier Areti, she gained experience at (among others) Peter Eisenman Architects, MVRDV and Wiel Arets Architects, and was head of research at Harry Guggler's group at the Swiss Federal Institute of Technology in Lausanne. Guillane has a degree in art history from the Sorbonne and a BA in product design from Central Saint Martins. She worked on several interior design projects prior to starting Areti. Pawson had not worked with Studio Areti before. He said, 'I was interested in the breadth of training and experiences the two sisters bring to their design studio - from architecture and art history to product design.'

# THE DESIGN

A suite of architectural  
elements for the interior of  
a reconfigured farmhouse.





\\ I like working with contrasts, //  
in terms of colour and natural  
patterning, so we are exploring the  
possibilities of pale oak and dark  
walnut, with their very different  
characters of grain. **John Pawson**



## THE DESIGN PROCESS

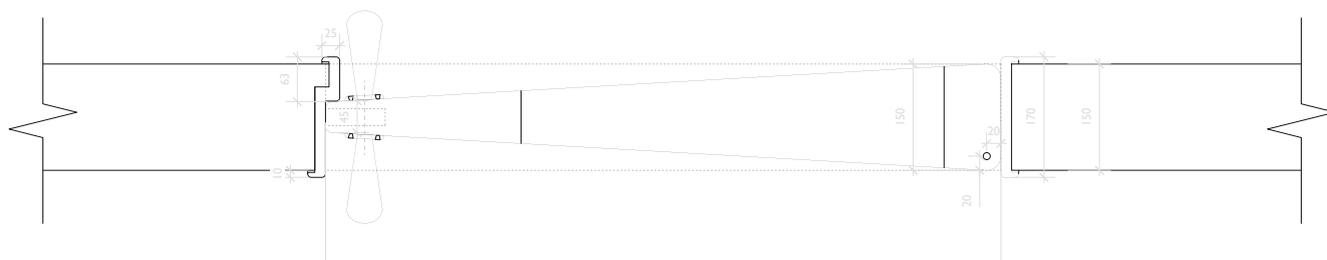
The most complex element that the pair designed was a door. 'When you have a door in a wall, it is an interruption to a very pristine surface,' Gwendolyn Kerschbaumer explained. 'We decided to design a door that is not ashamed, but that works with the wall in an elegant way.' The solution was to taper the door so that it always looks half open. This makes it very heavy on one side, and the design had to solve problems such as how to hang it, and where to put the stops so as not to interfere with the appearance. The shelves are simple but sophisticated, with triangular ends.



SPECIES  
USED

AMERICAN WALNUT

AMERICAN WHITE OAK



### THE TAPERED DOOR:

Horizontal section through the door with its unusual tapering form that makes it look slightly open from both sides

## THE MAKING PROCESS

Making the carcass of the door took a considerable amount of time, and it was finished with a 2.4mm-thick veneer of American white oak. In a sense, this is a prototype, and Guillane Kerschbaumer said, 'If we did it again, we would pay even more attention to the selection of the veneers.' The sisters chose to give a wax finish to the walnut shelves, a technique that Benchmark sees as old-fashioned. Sean Sutcliffe doubted they could achieve

the level of finish they aspired to, but was proved wrong! The handle and the hooks are part of a family - simple forms in walnut - as is the dimmer switch. This last shows the degree of attention to detail that the sisters brought to the project. When the light is off, the grain on the dimmer knob is aligned with that of the base plate. It is at 45 degrees when switched on and the switch can then turn to full lighting at a right angle.



**Clockwise from top:** The sisters at work; Gwendolyn waxes the bookshelves; the family of objects; the simple, elegant door handle; Guillane applies a finishing touch





## LIFE-CYCLE ENVIRONMENTAL ASSESSMENT

The wood content of the door is the major determinant of environmental impact, both positive and negative. The relative simplicity of the design allows the wood to speak for itself and avoids the need for elaborate processing and finishing.

The door is composed of American white oak, one of the most abundant hardwoods in US forests accounting for 15% of wood volume. US government forest inventory data shows that US white oak is growing 36 million m<sup>3</sup> per year while the harvest is 19.3 million m<sup>3</sup> per year. In other words, after harvesting, an additional 16.7 million m<sup>3</sup> of white oak accumulates in US forests every year. It takes around a quarter of a second for new growth to replace the hardwood for the door.

The shelves are made of walnut which, while not the most abundant of US hardwoods, is a large and expanding resource. Every year, 2.4 million m<sup>3</sup> of walnut accumulates in US forests, even after harvesting. It only takes around two seconds for new growth in the US forest to replace the walnut logs harvested to manufacture the shelves.

## CARBON FOOTPRINT IN CAR MILES:



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ALEX •  
DERIJKE

*what  
I have  
always  
wanted  
is...*



# A TABLE FOR DEMOCRATIC DINNERS

## 'TABLE TURNED'

BY BARNBY & DAY WITH ALEX DE RIJKE  
MADE FROM AMERICAN TULIPWOOD

### The Commissioner

Alex de Rijke is a founding director of dRMM Architects and dean of the School of Architecture at the Royal College of Art. He has been a strong advocate for engineered timber construction, and in 2013 his practice worked with Arup to design 'Endless Stair' for AHEC, a project in American tulipwood that pioneered the use of hardwood cross-laminated timber (CLT). dRMM's key projects include Clapham Manor primary school in London, which was shortlisted for the RIBA Stirling Prize in 2010, and Festival House, an award-winning chapel, tourist centre and café on the seafront in Blackpool. In 2013, dRMM was recognised as *Building Design* practice of the year.

### The Wish

Alex de Rijke wanted a large circular laminated tulipwood dining table. 'We know everything takes place at the table,' he said. 'The best decisions are made, meals are enjoyed, homework is done, computers are used.' A round table is, he said, 'more democratic. It means that children have as much say as adults.' He wanted to work with tulipwood again because he liked the fact that it is strong, light and abundant. In addition, he liked the way it looks - 'The liveliness of the grain varies because it has grown in different microclimates.' The idea of a table that looked solid but was actually hollow also appealed.



# THE DESIGNERS

Rob Barnby (on the right) and Lewis Day are furniture designers and makers, based in Hay-on-Wye on the Welsh border. Rob Barnby studied furniture design at Nottingham Trent University and, more unusually, Lewis Day studied motorsport engineering. They set up their business in 2012 and make everything themselves, using a simple, almost Scandinavian aesthetic and working exclusively in FSC-certified timber.



## THE DESIGN

A hollow pedestal table that looks as if it has been carved from a single, laminated tree.

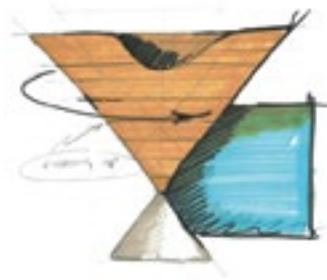


D E • R I J K E  
+ B A R N B Y  
& D A Y

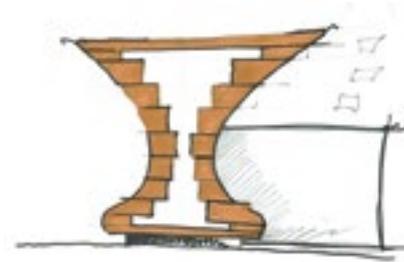
\\ Barnby & Day are //  
quick, imaginative  
and open-minded.  
You can't ask for  
more than that.  
**Alex de Rijke**



Alex de Rijke, Rob Barnby and Lewis Day at dRMM's studios



SKETCH 1:  
Investigation of the turning process



SKETCH 2:  
Details of the profile after refinement to fit de Rijke's legs

## THE DESIGN PROCESS

The design was initiated by Alex de Rijke, and then developed collaboratively with Barnby & Day, who went on to make it at Benchmark. The table was designed to be built up from 13 rings of three-layered CLT (in CLT, the grain runs in opposing

directions on each layer, making it more stable). The top is a CLT disc, 2m in diameter. One of Barnby & Day's suggestions was to create a hollow in the centre of the table which could act either as a fruit bowl or, with a spun copper insert, as an ice bucket for wine. This served two purposes - it used otherwise 'dead' space, and it enhanced the sense of solidity. In fact, the hollow is carved down into some additional CLT layers.

The other design considerations were to do with comfort and safety. The designers refined the curve of the pedestal, using a full-size cut-out to ensure that it could accommodate de Rijke's long legs - nobody else should have any problems. The other refinements were to do with the making. The table would be built up from the rings and then turned. It was the largest object ever turned at Benchmark and the specialist turner brought in, Mike Bradley, had to be certain it would be safe. The rings were made wider than originally considered to ensure there was no danger of it pulling apart.



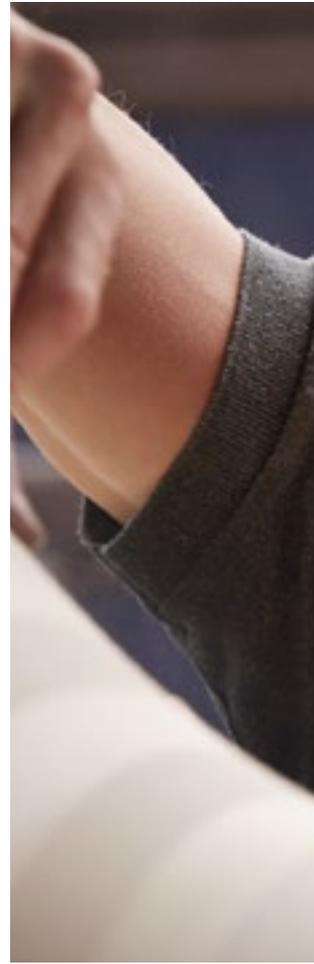
SPECIES  
USED

AMERICAN  
TULIPWOOD



## THE MAKING PROCESS

Rob Barnby said, 'We were both blown away by the enthusiasm and expertise of the Benchmark furniture makers... they are all very much of the attitude that anything can be achieved, and it was great working with them to find solutions to problems and ways around dilemmas.' After cutting the timber, Barnby and Day built up the CLT and cut the rings. Accuracy here was crucial, as it meant that the elements to be turned would be symmetrical, making the process easier. The table was turned in three sections. 'It was incredible watching Mike turning such a large object on the lathe,' said Day. 'He was pretty apprehensive to begin with but was pleasantly surprised by how it turned.' When the largest section turned, it went at a speed of 62mph on the outer edge - so it was essential that nothing went wrong. On the other hand, turning the indent in the centre was a slow process since even with the outside spinning away, this rotated at a leisurely pace. Alex de Rijke spent a day at Benchmark while the top of the table was turning, refining the profile of the edge. The end result, even with some excess material cut away from inside, weighs 170kg - more than was anticipated, but far less than the weight of the solid table it appears to be. And it would not have worked if it were solid because the top would have cracked with the movement.



**Clockwise from top left:**  
Lifting one section of  
the table onto another;  
Rob Barnby at work; the  
laminations are made  
clear by the colour  
variation.

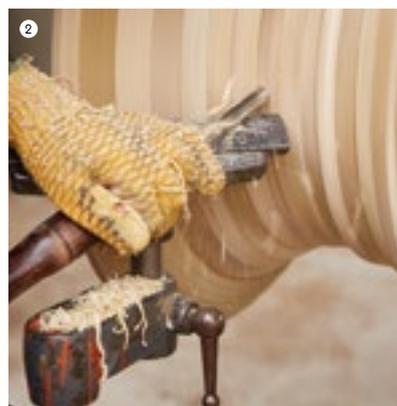




# HOW IT HAPPENED



## TURNING THE TABLE



- ① This was the largest piece ever turned at Benchmark
- ② Turning the base of the table
- ③ Alex de Rijke checks the profile



### LIFE-CYCLE ENVIRONMENTAL ASSESSMENT

Unsurprisingly, the mass of tulipwood used to construct the Barnby & Day table dominates the environmental impact, both positively and negatively. On the one hand, the energy generated from wood waste during manufacturing and at end-of-life offsets most of the carbon emissions. The product is highly durable and therefore has potential to act as a carbon store for decades. The fact that tulipwood is a quick-drying hardwood species, requiring no more than seven to ten days in the kiln, also helps to reduce environmental impact. On the other hand, the relatively large volume of tulipwood used in the table contributes to more significant acidification and eutrophication

impacts during transport. It also contributes to relatively high photochemical ozone creation potential (POCP). Partially mitigating these impacts is the potential for the table to remain in use for many years, minimising the need for replacement.

### CARBON FOOTPRINT IN CAR MILES:



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R I C H A R D • &  
A B • R O G E R S



*what we have  
always wanted is...*

# TO SEE LIFE FROM ANOTHER ANGLE

**'THE LADDER THAT LIKES THE WALL'**  
BY XENIA MOSELEY WITH RICHARD AND AB ROGERS  
MADE FROM AMERICAN RED OAK

## The Commissioners

Richard Rogers is an architect and founder of Rogers Stirk Harbour + Partners, whose best-known buildings include the Pompidou Centre in Paris, Lloyd's of London and Barajas Airport in Madrid. He is a prominent advocate for sustainable urban development, and has advised the UK government and the mayors of London and Barcelona on urban policy.

Ab Rogers, Richard's son, is also a designer. He trained as a cabinet maker before attending the Royal College of Art, and established Ab Rogers Design in 2004. The studio's work plays with colour, materials and function to inject a sense of poetry, magic and wonder into the everyday world. Ab Rogers is also head of interior design at the Royal College of Art.

## The Wish

The Rogers dreamt of a ladder that would be highly engineered and exquisitely crafted while celebrating the unique qualities of the wood, expressing the joints and playing with three-dimensional planes. Total stability would be borrowed from the existing architecture of the surrounding environment, leaning on a vertical surface – a wall or a bookcase – and the final piece would include a ladder, a perch and a side table (or two). They also wanted it to be materially economical. The ladder, therefore, needed to invert the A shape of the traditional orchard ladder to offer width at the top. 'A ladder,' said Ab Rogers, 'is the simplest diagram of how to get up off the ground.'



# THE DESIGNER

Xenia Moseley is a recent graduate in design and craft from Brighton University. Her projects are rooted in social engagement and self-development, with outcomes ranging from a prize-winning card game to a 'Journeywoman's boat'. She is continuing with her project as a wandering journeywoman, travelling around England learning new skills from masters of different crafts, while also participating in a social innovation programme in London.





## THE DESIGN

A ladder with a leather seat and a tray table at the top.



## THE DESIGN PROCESS

There is a sense of inherent instability in something that is broader at the top than at the base. Convinced that it could be done, however, Ab Rogers called in engineer Chris Wise of Expedition Engineering. 'Richard and I had an hour-long meeting with him,' Ab Rogers explained. 'We asked, what could we do to make the ladder more dynamic and ambitious?' The uprights of the ladder had to be designed so that they could provide handholds, since the person going up it needed something to hold onto as they turned and sat down. This has been resolved elegantly, with one upright having a tight outward curve at the top, and the other extending beyond the tray, which can fold away. A full-scale mock-up in plywood was made at Benchmark to test stability and the feeling of safety.





**MULTIPLE USES:**

**Top to bottom:** The rotating table adds to the utility; there is a slot to hold a glass of wine; the right-hand element can also support an iPad



**SKETCH:**

Xenia Moseley worked out early ideas in her notebook, including the way that the ladder would lean against the wall, and how the wine holder would operate



\\ It has been such a //  
roller coaster and a  
whirlwind. It's been  
more productive than  
I could ever have  
imagined.

**Xenia Moseley**

## THE MAKING PROCESS

This was a project on which the commissioners had very strong opinions and a nearly fully finished design. Moseley saw herself very much as a facilitator. 'At first I didn't see my stamp,' she said, 'but now it is very much a meeting of minds.' During the week at Benchmark, she became involved with steam-bending the oak - red oak was chosen for its particular strong steam-bending properties. For Moseley, an important part of the process was seeing the team at Benchmark solving problems - including Sean Sutcliffe getting his apron on to make a tricky joint that allowed the tray table to swivel.

**Clockwise from top left:**  
Xenia Moseley discusses  
progress with Ab Rogers  
and Sean Sutcliffe; checking  
the smoothness of the  
uprights; Moseley with Alice  
Blogg creating the wine  
holder; bending the wood  
after steaming



## LIFE-CYCLE ENVIRONMENTAL ASSESSMENT

While the ladder is composed primarily of American red oak, the overall environmental impact is heavily influenced by the use of other materials, notably the 700g of green leather used for the seat. Substitution of wood for this single component would significantly reduce the environmental burden. The high environmental impact of leather is due both to energy and chemical inputs associated with cattle farming and the even larger inputs during the manufacturing process. This process involves inputs of chemicals for de-hairing, biocides such as pentachlorophenol to prevent bacterial growth, and compounds of chromium, a heavy metal, for tanning. Carbon emissions during all stages of material extraction and processing, product manufacturing and transport are 155kg of CO<sub>2</sub> equivalent. The leather alone accounts for 48kg of these emissions while the aluminium for the footings accounts for a further 14kg.

### CARBON FOOTPRINT IN CAR MILES:



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P A U L ◦  
S M I T H

*what I have  
always  
wanted is...*



# A SHED TO ESCAPE THE HURLY BURLY

## 'PAUL'S SHED'

BY NATHALIE DE LEVAL WITH PAUL SMITH  
MADE FROM THERMALLY MODIFIED AMERICAN ASH

### The Commissioner

Sir Paul Smith is a quintessentially English designer who has created a hugely successful business that is known around the world. The Paul Smith empire now spans, menswear, womenswear, accessories and items for the home. He is described as having an 'eclectic aesthetic', putting antiques into his shops alongside the fashion, which is often seen as classic with a twist. The collecting extends to his workspace, which has shelves of the ephemera he has collected over the years. Despite having been in business for more than 40 years, and now heading up a global brand, he is still intimately involved not just as chairman but also as chief designer.

### The Wish

Initially, Paul Smith just asked for something handmade, but he quickly settled on a shed. Not surprisingly for such a busy person, he relished the idea of 'somewhere where you can go to switch off, somewhere to relax. In today's world where everyone is so busy, I think this is really important and very needed.' He was not looking for complete isolation however, stipulating that one end of the shed should be glazed, offering a view out. And, like the shed in which George Bernard Shaw used to write, Smith wanted his to rotate so that he could take advantage of sun or shade at different times of day.



# THE DESIGNER

Nathalie de Leval is an independent furniture designer and maker, focusing on bespoke commissions and products, predominantly in wood. Originally a sculptor, she studied cabinet making in order to improve her making skills, but the furniture quickly took over, taking her to an MA at the Royal College of Art, and from there to a series of furniture and interior projects including the London shops Browns in South Molton Street and Griffin on Portobello Road. Recently she has been working in partnership with Chelsea gold-winning garden designer Luciano Giubbilei on a range of garden furniture and accessories. Paul Smith chose to work with de Leval saying, 'Nathalie's understanding of the materials she works with is really amazing. She combines this with fantastic craftsmanship to make something truly contemporary.'



# THE DESIGN

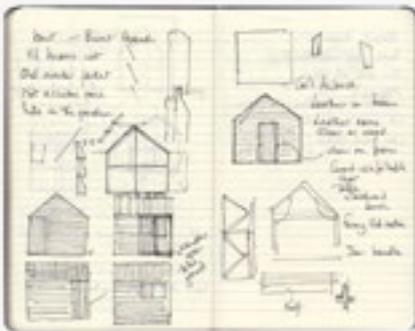
A rotating shed with a glazed end.





## THE DESIGN PROCESS

Inspiration for the shed came not only from Bernard Shaw but also from the tall fishermen's huts on the beach at Hastings and from the framed views on architect Luis Barragán's house in Mexico. The shed is 3m by 3m, the same size as Paul Smith's first shop in Nottingham. As with Bernard Shaw's famous writing hut, it sits on a revolving platform, allowing for day-long sun-chasing and making it the perfect room with a view. The choice of timber was essential since Smith wanted the shed to be all wood – the walls and the roof. Thermally modified hardwoods seemed a sensible choice as they have grade 1 durability. De Leval visited Morgan Timber in Kent and chose thermally modified ash which she liked for its rich colour and grain. The timber is left rough, exactly as it arrived in England, and is very characterful. There is a strip of bright green metal by the door, the only flash of colour. De Leval worked with engineer Andrew Lawrence at Arup to ensure the shed was structurally sound.



### SKETCH:

Nathalie de Leval's sketchbook, in which she worked out all the aspects of the shed's design





\\ It was such an experience //  
to work with Paul and his  
team, as well as Arup, on  
this perfectly proportioned  
miniature architectural  
project. **Nathalie de Leval**



#### A ROTATING SHED

The shed sits on castors and  
can be turned to face the sun



SPECIES  
USED

THERMALLY MODIFIED  
AMERICAN ASH



## THE MAKING PROCESS

It took two days to make the base for the shed, which sits on a rotating mechanism (rotation is by hand). There are diagonal tensioning cables to hold the shed in shape. The base is effectively a box structure, on castors. 'It is all incredibly low tech, which I like,' De Leval said. 'It's a flat pack.' The structure had, however, to be very accurate, since the Crittall windows had to fit in the end facade. The finished shed was dressed by Nicholas Chandor, a designer who has worked frequently with Smith.



**Clockwise from top left:** Thermally modified ash ready for use; Nathalie de Leval checks the dimensions; the finishing touch



# HOW IT HAPPENED



## BUILDING THE SHED



- ① Constructing the base was complex
- ② Erecting the walls
- ③ Bracing the walls
- ④ Fixing the cladding



### LIFE-CYCLE ENVIRONMENTAL ASSESSMENT

Unsurprisingly, the large amount of thermally treated ash used for construction of the shed is a dominant factor in the environmental impact, both positive and negative. On the one hand, the energy generated from wood waste during manufacturing and at end-of-life offset the majority of carbon emissions. With just a few minor alterations - such as a small reduction in the number of metal fixings used - the shed would be carbon neutral on a cradle-to-grave basis. Use of thermally modified ash also means the shed is highly durable, with potential to provide a carbon store for many decades.

On the other hand, the relatively large use of ash contributes to more significant acidification and eutrophication impacts

during transport. Kiln drying of ash also contributes to relatively high photochemical ozone creation potential (POCP). This highlights the importance of durability as a mitigating factor to reduce the need for replacement.

### CARBON FOOTPRINT IN CAR MILES:



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TECHNICAL

# EVALUATING ENVIRONMENTAL IMPACTS

Scientific life-cycle assessment uncovers the products' true environmental credentials

**L**ife-cycle environmental assessment (LCA) involves the collection and evaluation of quantitative data on all the inputs and outputs of material, energy and waste flows associated with a product over its entire life cycle so that the environmental impacts can be determined. LCA quantifies environmental effects against a range of impact categories (see page 103). It may also provide qualitative assessment of other environmental impacts, such as on biodiversity and land use, that are less easy to quantify.

The LCA of The Wish List builds on a two-year study, commissioned by AHEC and undertaken by PE International, to assess environmental impacts associated with delivery of US hardwood material into world markets.<sup>1</sup> This involved a wide-ranging independent assessment of hardwood forestry practices and a survey of the hundreds of US companies engaged in the processing and export of

hardwood products.

Information from the LCA of US hardwoods was combined with data gathered during product manufacture at Benchmark in the UK. It was also combined with PE's existing life-cycle inventory database, which covers an expanding range of non-wood materials and product groups.

To model the cradle-to-grave impact of The Wish List, the following assumptions are made about waste disposal during manufacturing and at the end of the product's life:

- 80% of hardwood waste is used as a fuel for biomass boilers, substituting for light fuel oil.
- The remaining 20% of hardwood waste is reused for other products (no benefits have been modelled for this option).
- Other parts (including glues, coatings, fittings etc) are incinerated, with electricity and thermal-energy recovery using appropriate datasets.

These assumptions are based on information gathered from Benchmark

about its standard procedures for use of waste and from secondary sources about waste-disposal practices in the UK.

The LCA of each product on The Wish List was modelled separately and the detailed results for each are available on [www.wishlistdf.info](http://www.wishlistdf.info). This section provides an overview of the environmental impacts of the full set of projects from The Wish List, for which data is summarised in the chart on page 102.

## Positive biodiversity and land-use impacts

The LCA of US hardwood undertaken by PE assessed the impact of hardwood extraction on land use and biodiversity, drawing on regular US government forest inventory data and other independent reports. PE concludes that, 'in the system under investigation the main material – wood – comes from naturally re-grown forests. The harvested areas had undergone several iterations

<sup>1</sup> Available at [www.americanhardwood.org/fileadmin/docs/sustainability/Final\\_LCA\\_Lumber\\_report.pdf](http://www.americanhardwood.org/fileadmin/docs/sustainability/Final_LCA_Lumber_report.pdf)

of harvesting and re-growth. After harvesting, the land is returned to forest so there is no direct land use change to account for in the timeline of few hundred years.'

On biodiversity impacts, PE concludes: 'Conversion of any other commercial land into the hardwood forest would most probably have a positive impact on the land quality including biodiversity and associated ecosystem services.'

US government forest inventory data<sup>2</sup> shows that US hardwoods are growing at a rate of 271 million m<sup>3</sup> per year while the annual average harvest is 141 million m<sup>3</sup> per year. This means that, even after harvesting, an additional 130 million m<sup>3</sup> of hardwood accumulates in US forests every year. It takes less than two seconds for the 13m<sup>3</sup> of US hardwood logs harvested

to manufacture all the products of The Wish List to be replaced by new growth.

### Carbon footprint

On a full cradle-to-grave basis, the carbon footprint of all the products on The Wish List is 0.61 tonnes of CO<sub>2</sub> equivalent. That's less than the carbon footprint of one person on a return flight from London to New York.

Wood's dual role as a material for product fabrication and as biomass for energy production has important consequences for the carbon footprint. Carbon emissions during all stages of material extraction and processing, product manufacturing and transport for all the products are 4.15 tonnes of CO<sub>2</sub> equivalent. Of these emissions, 2.48 tonnes are associated with the supply of wood, mainly US hardwood.

It takes less than two seconds to replace the logs

These emissions are offset by 3.54 tonnes of CO<sub>2</sub> equivalent resulting from substitution of fossil fuels through use of wood waste, generated both during manufacturing and at end-of-life for energy production.

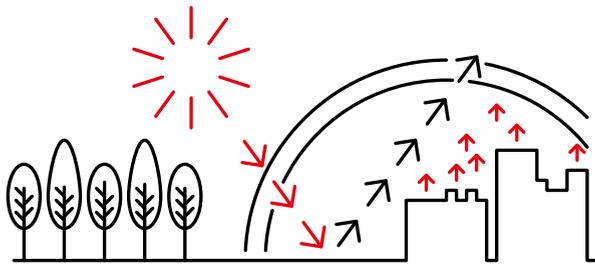
The credits associated with use of wood waste as fuel actually outweigh the impacts associated with producing and transporting the wood. This has the interesting consequence that the more wood you use, the lower the carbon footprint becomes. For this reason, the larger Wish List products do not necessarily have a significantly higher carbon footprint than the smaller products.

Because the wood used for The Wish List products is better than carbon neutral, other less visible materials have a disproportionately large impact on the carbon footprint. This is particularly apparent in the ladder by Xenia Moseley for Richard and Ab Rogers. The 700g of green leather used for the seat on the ladder accounted for one half of the total carbon footprint of the product. Substitution of wood for this single component would significantly reduce the environmental burden. Similarly, even a small reduction in the number of metal fixings used for the shed by Nathalie de Leval for Paul Smith would make it carbon neutral on a cradle-to-grave basis.

GRAPH: The environmental impacts of the full set of projects from The Wish List

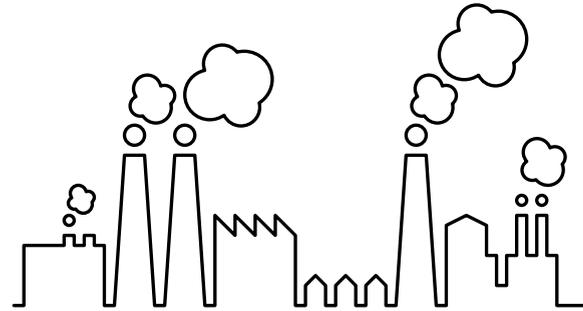


<sup>2</sup> These figures have been calculated by AHEC drawing on 2011/2012 data downloaded from the U.S. Forest Service Forest Inventory and Analysis (FIA) program at <http://www.fia.fs.fed.us/>



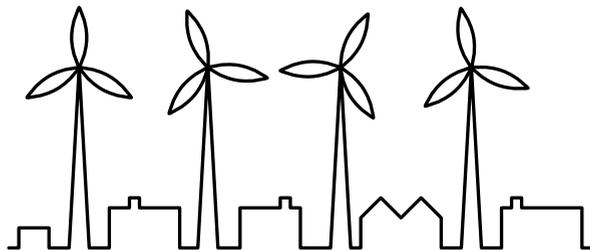
### 1 GLOBAL WARMING POTENTIAL (GWP)

Global warming is usually regarded as one of the most significant environmental issues. Global warming potential, measured in kg CO<sub>2</sub> equivalent, is also a good marker for other environmental impacts. It is calculated from the volumes of greenhouse gases, such as CO<sub>2</sub> and methane, emitted during a process.



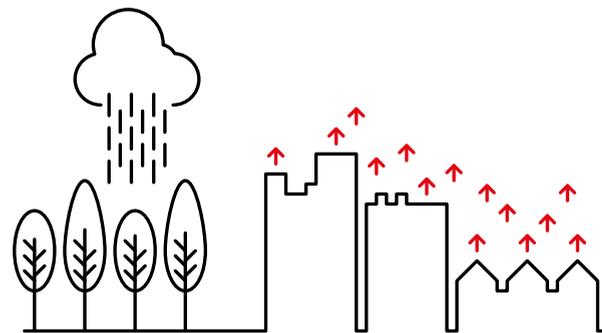
### 2 PRIMARY ENERGY DEMAND (NON-RENEWABLE RESOURCES)

This is a measure of the total demand of primary energy that comes from non-renewable resources, such as oil and natural gas. Measured in gigajoules (GJ), the primary energy demand takes into account the conversion efficiencies from the primary energy to, for example, electricity. The generation of carbon dioxide (CO<sub>2</sub>) from the production of energy is one of the major causes of global warming.



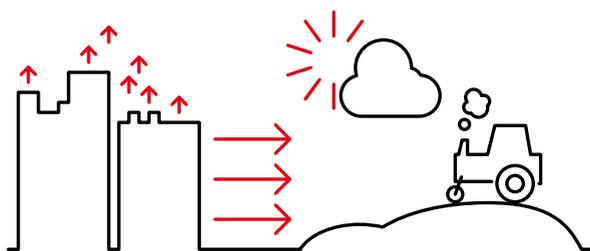
### 3 PRIMARY ENERGY DEMAND (RENEWABLE RESOURCES)

Like the primary energy demand from non-renewable resources, this is a measure of the total amount of primary energy, but in this case derived from renewable sources such as hydropower and wind energy. Again, it takes conversion efficiencies into account where appropriate. Total primary energy demand can be measured by adding the figures for energy from non-renewable and renewable resources.



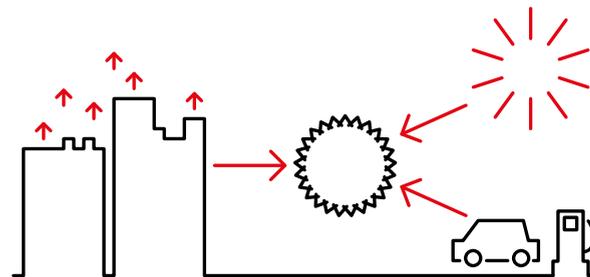
### 4 ACIDIFICATION POTENTIAL (AP)

This is a measure of the emissions that lead to acidifying effects in the environment, which can cause imbalances and the death of species. Emissions of sulphur dioxide (SO<sub>2</sub>) and nitrous oxide result in acid rain which can fall some way from the place where the emissions occur. Acidification potential is measured in kg of SO<sub>2</sub> equivalent.



### 5 EUTROPHICATION POTENTIAL (EP)

Eutrophication is the process by which water receives an excessive amount of nutrients, particularly phosphates and nitrates. These nutrients, which typically come from run-off from fertilisers, lead to algal blooms which, in turn, deprive the water of oxygen and lead to imbalances and deaths in the aquatic populations. Eutrophication is measured in terms of kg of phosphate equivalent, and kg of nitrogen equivalent.



### 6 PHOTOCHEMICAL OZONE CREATION POTENTIAL (POCP)

This is a measure of emissions or precursors that contribute to low-level smog. It is measured in kg of ethene equivalent. Ozone layer depletion potential (ODP) is also part of the i-report but is not included in the charts because the effect is negligible. There may seem to be a contradiction between these two impacts but, put simply, high-level ozone is good and should be protected, whereas ozone at ground level is a pollutant.

## Acidification potential

The total acidification potential of all the products on The Wish List is 20.8kg of sulphur dioxide (SO<sub>2</sub>) equivalent. Acidification is caused mainly by the burning of fossil fuels, and the scale of impact is directly related to their sulphur content.

Over half of the acidification potential of The Wish List products is due to emissions during shipping of hardwoods from the US to Europe and reflects the relatively high sulphur content of marine fuels. The extent to which this impact can be reduced for products shipped from overseas is very dependent on international progress to reduce the sulphur content of these fuels. Efforts are being made to progressively tighten requirements under the International Convention for the Prevention of Pollution from Ships (MARPOL). A target has been set that the sulphur content of any fuel oil used on ships should not exceed 0.5% from 2020 onwards. This target is a long way from being met internationally and The Wish List study uses a figure of 2.7%, which is the assumed current global average.

## Photochemical ozone creation potential (POCP)

The Wish List products have a combined POCP of 5.23kg of ethene equivalent. Most is due to emissions of terpenes - volatile organic compounds (VOCs) released from wood resins. Terpenes are released naturally as trees grow, but processes in which wood is heated (such as kiln drying) result in more significant emissions. In

practice, there is substantial variation in the level of VOC emissions between species and they also depend on drying times and other factors such as the mix of heartwood and sapwood.

Most US hardwood processing happens in rural areas, with the implication that terpene emissions are less likely to contribute to urban smog. Terpenes have a short atmospheric lifespan and the highest photo-oxidant concentrations are expected within five hours of emission taking place, and within a distance of 50km. The environmental impact of terpenes also

\\ Fertilisers are rarely needed to encourage growth of American hardwoods

varies widely depending on the local presence of other pollutants, notably nitrogen oxides. For the general public, the smell surrounding wood-processing units is likely to be the most noticeable environmental effect.

Nevertheless, the photo-oxidants created due to terpene emissions can cause forest and crop damage, and they are harmful to humans as they cause irritation in the respiratory tract and in sensitive parts of the lungs. This finding highlights the need for more work to understand the specific impacts of terpene emissions within the context of US hardwood kilning

facilities and the actions required to mitigate these impacts.

## Eutrophication potential

The total eutrophication potential of all the products on The Wish List is 2.43kg of phosphate equivalent - about the same as that caused each year by conventional farming of 0.1 hectares of land for wheat in the UK. So while not negligible, the eutrophication potential is not as significant an issue for The Wish List products as the acidification potential or POCP.

Perhaps surprisingly, hardly any of the eutrophication associated with The Wish List products is linked to the growth of US hardwood. Fertilisers are very rarely needed to encourage growth of American hardwoods since they thrive under natural conditions. Instead, nearly all eutrophication potential of The Wish List is due to nitrate emissions during burning of fuels for transport and processing of materials.

## Value of a long life

An important factor mitigating the environmental effects of The Wish List is the long life expectancy of each of the products: the less need for replacement, the less repetition of impacts. In the case of wood, there is the additional benefit that long-lived products supplement the carbon store in the forest and help to keep CO<sub>2</sub> out of the atmosphere. The likely longevity of The Wish List is a tribute both to the skills of the designers and Benchmark's craftsmen and to the beauty and durability of US hardwoods. ■

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For over 20 years, the American Hardwood Export Council (AHEC) has been at the forefront of global wood promotion, successfully building a distinctive and creative brand for US hardwoods. AHEC's support for creative design projects such as 'Endless Stair', for the London Design Festival, demonstrates the performance potential of these sustainable materials and provides valuable inspiration.

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[www.petrkrejci.com](http://www.petrkrejci.com)

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for exhibition build

**Bulthaup Clerkenwell**

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for photography location

**James Latham**

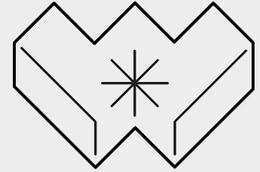
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T H E · W I S H · L I S T

Produced by Nick Watts  
Design for the American  
Hardwood Export Council  
(AHEC)

**Author:**

Ruth Slavid

**Author (LCA chapter):**

Rupert Oliver

**Art director:**

Nick Watts

**Editor:**

Belinda Cobden-Ramsay

**Sub-editors:**

Tamsin Marshall

Nick Jones

**Photography and art**

**direction (images):**

Petr Krejčí

**Additional photography:**

Jan Horník

**Photography assistance:**

Thomas Holloway

**Graphic Designer:**

Stephen Savage

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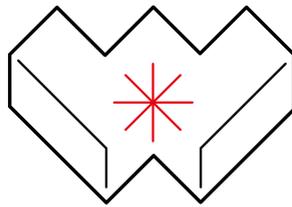
[nickwattsdesign.co.uk](http://nickwattsdesign.co.uk)





## THE TEAM WHO HELPED THE PROJECT HAPPEN AT BENCHMARK:

Terence & Vicki Conran, Sean Sutcliffe, Steven Huzzey, Steve Cooper, Steve Owens, Adam Cheeseman, Alexis Northam, Andrew Headland, Andrew Morgan, Andy Tungate, Ben Morgan, Chris Jordan, Colin Butler, Colin White, Craig Brown, Craig Harvey, Daniel Thomas, Darren Jarvis, Fiona Coyne, Graeme Jones, Graham Martin, Harry Baker, Hattie Gallagher, Joe Robbins, Joe Drake, Josh Hale, Josh Milton, Judy Miller, Kathryn Webb, Kelvyn Dennis, Kenny Hedges, Kevin Gadd, Marc Wood, Mark Hinton, Mark Paradise, Martin Lloyd, Martin O'Hara, Michael Lewis, Mike Richards, Noel Hunt, Oliver Tilbury, Paul Henry, Peter Everest, Peter Lowe, Philip Marchant, Robert Honeyman, Ross Dickson, Ryan Gullless, Simon Kenworthy, Tom Stepp, Will Fearnley, Jo Winter, Mary Potter, Liam Treanor, Jo Weaden, George Mead, Steven Andrews, Alex Roebuck, Shaun Poole, Mike Bradley, Adam Bradley, Alice Blogg, Tony Harvey, Jess Tully



## T H E · W I S H · L I S T

The Wish List is like a dream come true. Ten of the biggest names in design acted as 'commissioners', each asking an up-and-coming designer to design and make for them the object that they had always wanted. The only stipulation was that it should be in American hardwood.

The process culminated in a week of making at furniture company Benchmark, where the young designers not only acquired new skills but also learnt a lot about sustainability through taking detailed measurements for a life-cycle environmental assessment (LCA).

The results, exhibited at the London Design Festival 2014 and shown in this publication, are surprising, intriguing and universally delightful.